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CENTERS FOR DISEASE CONTROL
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MORBIDITY AND MORTALITY
WEEKLY REPORT

CDC
Surveillance
Summaries

Trends in Self-Reported Use
of Mammograms (1989–1997)
and Papanicolaou Tests (1991–1997) —
Behavioral Risk Factor
Surveillance System

Contents

Reports Published in *CDC Surveillance Summaries* Since January 1, 1988

Subject	Responsible CIO/Agency*	Most Recent Report
Abortion	NCCDPHP	1999; Vol. 48, No. SS-4
AIDS/HIV		
AIDS-Defining Opportunistic Illnesses	NCHSTP/NCID	1999; Vol. 48, No. SS-2
Distribution by Racial/Ethnic Group	NCID	1988; Vol. 37, No. SS-3
Among Black and Hispanic Children		
and Women of Childbearing Age	NCEHIC	1990; Vol. 39, No. SS-3
Asthma	NCEH	1998; Vol. 47, No. SS-1
Behavioral Risk Factors	NCCDPHP	1997; Vol. 46, No. SS-3
Birth Defects		
Birth Defects Monitoring Program		
(see also Malformations)	NCEH	1993; Vol. 42, No. SS-1
Contribution of Birth Defects to Infant Mortality		
Among Minority Groups	NCEHIC	1990; Vol. 39, No. SS-3
Breast and Cervical Cancer	NCCDPHP	1999; Vol. 48, No. SS-5
Campylobacter	NCID	1988; Vol. 37, No. SS-2
Cardiovascular Disease	EPO/NCCDPHP	1998; Vol. 47, No. SS-5
Chancroid	NCPS	1992; Vol. 41, No. SS-3
Chlamydia	NCPS	1993; Vol. 42, No. SS-3
Cholera	NCID	1992; Vol. 41, No. SS-1
Chronic Fatigue Syndrome	NCID	1997; Vol. 46, No. SS-2
Congenital Malformations, Minority Groups	NCEHIC	1988; Vol. 37, No. SS-3
Contraception Practices	NCCDPHP	1992; Vol. 41, No. SS-4
Cytomegalovirus Disease, Congenital	NCID	1992; Vol. 41, No. SS-2
Dengue	NCID	1994; Vol. 43, No. SS-2
Dental Caries and Periodontal Disease Among		
Mexican-American Children	NCPS	1988; Vol. 37, No. SS-3
Developmental Disabilities	NCEH	1996; Vol. 45, No. SS-2
Diabetes Mellitus	NCCDPHP	1993; Vol. 42, No. SS-2
Dracunculiasis	NCID	1992; Vol. 41, No. SS-1
Ectopic Pregnancy	NCCDPHP	1993; Vol. 42, No. SS-6
Elderly, Hospitalizations Among	NCCDPHP	1991; Vol. 40, No. SS-1
Escherichia coli O157	NCID	1991; Vol. 40, No. SS-1
Evacuation Camps	EPO	1992; Vol. 41, No. SS-4
Family Planning Services at Title X Clinics	NCCDPHP	1995; Vol. 44, No. SS-2
Food Safety	NCID	1998; Vol. 47, No. SS-4
Gonorrhea and Syphilis, Teenagers	NCPS	1993; Vol. 42, No. SS-3
Hazardous Substances Emergency Events	ATSDR	1994; Vol. 43, No. SS-2
Health Surveillance Systems	IHPO	1992; Vol. 41, No. SS-4
Homicide	NCEHIC	1992; Vol. 41, No. SS-3
Homicides, Black Males	NCEHIC	1988; Vol. 37, No. SS-1
Hysterectomy	NCCDPHP	1997; Vol. 46, No. SS-4
Infant Mortality (see also National Infant Mortality;		
Birth Defects; Postneonatal Mortality)	NCEHIC	1990; Vol. 39, No. SS-3
Influenza	NCID	1997; Vol. 46, No. SS-1
Injury		
Death Rates, Blacks and Whites	NCEHIC	1988; Vol. 37, No. SS-3
Drownings	NCEHIC	1988; Vol. 37, No. SS-1
Falls, Deaths	NCEHIC	1988; Vol. 37, No. SS-1
Firearm-Related Deaths, Unintentional	NCEHIC	1988; Vol. 37, No. SS-1
Head and Neck	NCIPC	1993; Vol. 42, No. SS-5

*Abbreviations

ATSDR	Agency for Toxic Substances and Disease Registry
CIO	Centers/Institute/Offices
EPO	Epidemiology Program Office
IHPO	International Health Program Office
NCCDPHP	National Center for Chronic Disease Prevention and Health Promotion
NCEH	National Center for Environmental Health
NCEHIC	National Center for Environmental Health and Injury Control
NCID	National Center for Infectious Diseases
NCIPC	National Center for Injury Prevention and Control
NCPS	National Center for Prevention Services
NIOSH	National Institute for Occupational Safety and Health
NIP	National Immunization Program

Reports Published in *CDC Surveillance Summaries* Since January 1, 1988 — Continued

Subject	Responsible CIO/Agency*	Most Recent Report
In Developing Countries	NCEHIC	1992; Vol. 41, No. SS-1
In the Home, Persons <15 Years of Age	NCEHIC	1988; Vol. 37, No. SS-1
Motor Vehicle-Related Deaths	NCEHIC	1988; Vol. 37, No. SS-1
Objectives of Injury Control, State and Local	NCEHIC	1988; Vol. 37, No. SS-1
Objectives of Injury Control, National	NCEHIC	1988; Vol. 37, No. SS-1
Residential Fires, Deaths	NCEHIC	1988; Vol. 37, No. SS-1
Tap Water Scalds	NCEHIC	1988; Vol. 37, No. SS-1
Lead Poisoning, Childhood	NCEHIC	1990; Vol. 39, No. SS-4
Low Birth Weight	NCCDPHP	1990; Vol. 39, No. SS-3
Malaria	NCID	1999; Vol. 48, No. SS-1
Measles	NCPS	1992; Vol. 41, No. SS-6
Meningococcal Disease	NCID	1993; Vol. 42, No. SS-2
Mumps	NIP	1995; Vol. 44, No. SS-3
National Infant Mortality (see also Infant Mortality; Birth Defects)	NCCDPHP	1989; Vol. 38, No. SS-3
Neisseria gonorrhoeae, Antimicrobial Resistance in	NCPS	1993; Vol. 42, No. SS-3
Neural Tube Defects	NCEH	1995; Vol. 44, No. SS-4
Occupational Injuries/Disease		
Asthma	NIOSH	1999; Vol. 48, No. SS-3
Silicosis	NIOSH	1997; Vol. 46, No. SS-1
Parasites, Intestinal	NCID	1991; Vol. 40, No. SS-4
Pediatric Nutrition	NCCDPHP	1992; Vol. 41, No. SS-7
Pertussis	NCPS	1992; Vol. 41, No. SS-8
Plague, American Indians	NCID	1988; Vol. 37, No. SS-3
Poliomyelitis	NCPS	1992; Vol. 41, No. SS-1
Postneonatal Mortality	NCCDPHP	1998; Vol. 47, No. SS-2
Pregnancy		
Pregnancy Nutrition	NCCDPHP	1992; Vol. 41, No. SS-7
Pregnancy-Related Mortality	NCCDPHP	1997; Vol. 46, No. SS-4
Pregnancy, Teenage	NCCDPHP	1993; Vol. 42, No. SS-6
Rabies	NCID	1989; Vol. 38, No. SS-1
Racial/Ethnic Minority Groups	Various	1990; Vol. 39, No. SS-3
Respiratory Disease	NCEHIC	1992; Vol. 41, No. SS-4
Rotavirus	NCID	1992; Vol. 41, No. SS-3
Salmonella	NCID	1988; Vol. 37, No. SS-2
School Health Education Profiles	NCCDPHP	1998; Vol. 47, No. SS-4
Sexually Transmitted Diseases in Italy	NCPS	1992; Vol. 41, No. SS-1
Smoking	NCCDPHP	1990; Vol. 39, No. SS-3
Smoking-Attributable Mortality	NCCDPHP	1994; Vol. 43, No. SS-1
Tobacco-Control Laws, State	NCCDPHP	1999; Vol. 48, No. SS-3
Tobacco-Use Behaviors	NCCDPHP	1994; Vol. 43, No. SS-3
Spina Bifida	NCEH	1996; Vol. 45, No. SS-2
Streptococcal Disease (Group B)	NCID	1992; Vol. 41, No. SS-6
Suicides, Persons 15–24 Years of Age	NCEHIC	1988; Vol. 37, No. SS-1
Syphilis, Congenital	NCPS	1993; Vol. 42, No. SS-6
Syphilis, Primary and Secondary	NCPS	1993; Vol. 42, No. SS-3
Tetanus	NIP	1998; Vol. 47, No. SS-2
Trichinosis	NCID	1991; Vol. 40, No. SS-3
Tuberculosis	NCPS	1991; Vol. 40, No. SS-3
Waterborne-Disease Outbreaks	NCID	1998; Vol. 47, No. SS-5
Years of Potential Life Lost	EPO	1992; Vol. 41, No. SS-6
Youth Risk Behaviors	NCCDPHP	1998; Vol. 47, No. SS-3
Youth Risk Behaviors, College Students	NCCDPHP	1997; Vol. 46, No. SS-6

Trends in Self-Reported Use of Mammograms (1989–1997) and Papanicolaou Tests (1991–1997) — Behavioral Risk Factor Surveillance System

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Abstract

Problem/Condition: In 1999, an estimated 175,000 women will be diagnosed with breast cancer, and 43,300 will die from the disease. In the same year, an estimated 12,800 women will be diagnosed with invasive cervical cancer, and 4,800 will die from it. Early detection and timely treatment of breast cancer and cervical dysplasia can alter the progress of and reduce mortality from these diseases.

Reporting Period Covered: 1989–1997 for breast cancer screening and 1991–1997 for cervical cancer screening.

Description of System: The Behavioral Risk Factor Surveillance System is a state-based telephone survey of the civilian, noninstitutionalized adult population (i.e., persons aged ≥18 years). In this report, responses for women aged ≥40 years are included for measures of breast cancer screening, and responses for women aged ≥18 years with an intact uterine cervix are included for measures of cervical cancer screening.

Results: The percentage of women aged ≥40 years who reported ever participating in breast cancer screening and the proportion who had participated within the previous 2 years increased during 1989–1997. The percentage of women aged ≥18 years who reported ever participating in cervical cancer screening and the proportion who had participated within the previous 2 years were stable during 1991–1997. For both types of screening, substantially fewer women had received screening within the previous 2 years than had ever been screened.

Interpretation: These findings may indicate that some women who participate in initial screening do not seek further screening.

Actions Taken: Initiatives to encourage women to receive initial screening should continue, but additional initiatives specifically aimed at promoting rescreening should be developed. Continued surveillance of the percentage of women who receive regular screening will help public health officials evaluate breast and cervical cancer prevention programs.

INTRODUCTION

In 1999, an estimated 175,000 women will be diagnosed with breast cancer, and 43,300 will die from the disease. In the same year, an estimated 12,800 women will be

diagnosed with invasive cervical cancer, and 4,800 will die from it (1). Early detection and timely treatment of breast cancer and cervical dysplasia can alter the progress of and reduce mortality from these diseases (2). This report summarizes trends in the self-reported use of mammograms, the principal procedure for breast cancer screening, and Papanicolaou (Pap) tests, the principal procedure for cervical cancer screening, as tracked by the Behavioral Risk Factor Surveillance System (BRFSS).

In the United States, the incidence of breast cancer increased 25.3% (whites: 26.2%; blacks: 36.7%) from 1973 through 1996 (3). Most of the increase occurred during 1973–1991; during 1992–1996, the overall incidence was stable. From 1973 through 1996, the age-adjusted mortality rate from invasive breast cancer for all women declined from 26.9 to 24.3 per 100,000 women (3).

Decreases in breast cancer mortality can be partially attributed to earlier disease detection and treatment due to greater use of screening, which has been proven effective for detecting breast cancer in early stages (4). Findings from clinical trials evaluating the efficacy of screening mammograms have indicated that deaths from cancer could be reduced by 19%–30% if guidelines for regular breast cancer screening were followed (2,5,6).

From 1973 through 1996, the incidence of invasive cervical cancer decreased 44.0% (whites: 44.5%; blacks: 60.2%) in the United States (3). During this period, mortality due to this disease also decreased, by 47.3% (whites: 45.7%; blacks: 57.3%). The decline in mortality appears to be part of a long-term trend. During 1950–1959, the age-adjusted mortality from invasive cervical cancer per 100,000 U.S. women was 9.1 among whites and 21.2 among nonwhites (7). In 1996, mortality was 2.4 among whites and 5.2 among blacks (3).

Much of the reduction in cervical cancer mortality has been associated with increased use of Pap tests. The effectiveness of this test for reducing cervical cancer mortality has not been formally evaluated in experimental or randomized trials. However, accumulated evidence indicates that Pap tests can detect asymptomatic precancerous lesions (i.e., dysplasia) and preinvasive lesions, which may progress to invasive cervical cancer if untreated (8). Detection and treatment of precancerous and preinvasive lesions can reduce the risk for developing invasive cervical cancer (9). Further, early detection and treatment of invasive cervical cancer may improve the prognosis for women diagnosed with this disease. From 1986 through 1992, the 5-year survival for women diagnosed with localized invasive cervical cancer was 91%; for women diagnosed with distant disease, 5-year survival was approximately 9% (7). Conclusions based on improved survival must be evaluated cautiously because of possible lead time or length bias (8). Nevertheless, an estimated 37%–60% reduction in cervical cancer mortality could be achieved with regular screening for all women (2).

The state-based BRFSS monitors self-reported health behaviors of U.S. adults (i.e., persons aged ≥18 years). In this report, trends in BRFSS data on self-reported receipt of breast cancer screening (1989–1997) among women aged ≥40 years and cervical cancer screening (1991–1997) among women aged ≥18 years with an intact uterine cervix are presented. The report includes state-specific estimates and estimates across participating states by age, race, ethnicity, annual household income, education, and (beginning in 1991) insurance status. Only data from the 38 states that

participated continuously in the BRFSS from 1989 through 1997 are included in this report (Figure 1).

METHODS

The use, history, and objectives of the BRFSS have been previously described (10).

Sampling

Every month, using random-digit-dialing telephone survey techniques, each state health department selected a probability sample of its civilian, noninstitutionalized adult population living in households with telephones (10,11). Most states used multistage cluster sampling based on the Waksberg method (12); other states used simple random, stratified random, or other sampling designs.

Questionnaire

From 1989 through 1997, each adult female respondent was asked whether she had ever had a mammogram. A respondent who answered positively was then asked how long it had been since her last mammogram and whether that mammogram had been performed as part of a routine checkup, because of a breast problem other than cancer, or because she already had breast cancer. Beginning in 1990, each woman was also asked whether she had ever received a clinical breast examination (CBE). If the answer was "yes," the respondent was then asked how long it had been since her last CBE and whether it had been performed as part of a routine checkup, because of a

FIGURE 1. States participating in the Behavioral Risk Factor Surveillance System each year from 1989 through 1997
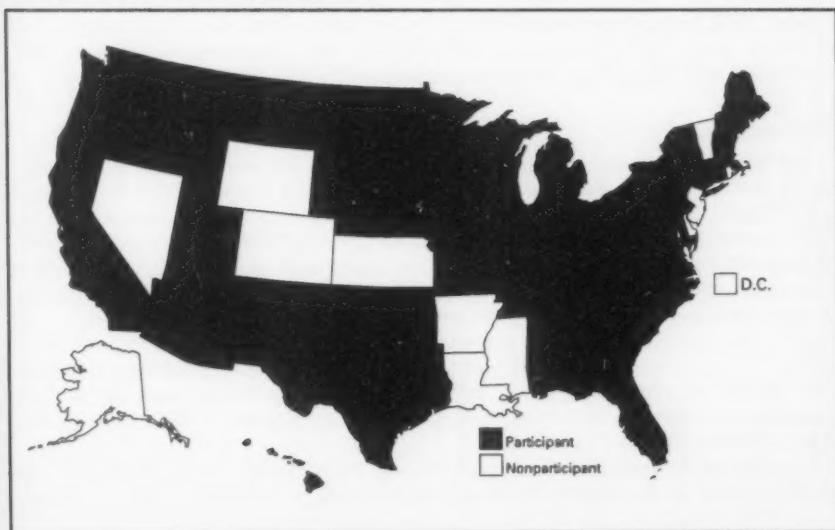
breast problem other than cancer, or because she already had breast cancer. In this report, only women aged ≥40 years were included in the analyses of mammogram and CBE use.

From 1991 through 1997, each adult female respondent was asked whether she had ever received a Pap test. Each woman who reported receiving the test was then asked how long it had been since her last test and whether it had been performed as part of a routine checkup or for another reason. In addition, each woman was asked whether she had had a hysterectomy. All women aged ≥18 years who answered "no" (i.e., had an intact uterine cervix) were included in the analyses of Pap test use.

Data Processing and Analysis

BRFSS is designed to provide state-specific prevalence estimates. These estimates are weighted to the age, sex, and race (i.e., white and nonwhite) distribution of each state's adult population by using the most current census or intercensal estimates. Estimates are also weighted to reflect each respondent's probability of selection.

Estimates for mammography use and Pap test use were adjusted to the age distribution of women in the 1989 BRFSS sample for participating states. Time trends were evaluated with logistic regression by using models in which the outcome was regressed on the respondent's age and the interview year. A time trend was considered statistically significant if the beta coefficient for year was non-zero at $p \leq 0.01$. SUDAAN, a statistical package for analyzing complex survey data, was used to calculate the standard errors for the prevalence estimates (13).

RESULTS

The number of women who participated in the BRFSS increased from 37,009 in 1989 to 62,278 in 1997. The median response rate ranged from 77% to 84% across the 9 years. Most respondents were aged ≥40 years, were white, were non-Hispanic, had an annual household income of $10,000–$50,000, had graduated from high school, had health-care insurance, and had not undergone a hysterectomy (Table 1).

Mammography

The total age-adjusted proportion of women aged ≥40 years who reported ever having a mammogram increased from 63.9% in 1989 to 84.8% in 1997 (p for trend <0.01) (Figure 2). This proportion increased in each of the participating states, and the range across the 38 participating states shifted from 52.7%–73.9% in 1989 to 74.5%–89.2% in 1997 (Table 2). The age-adjusted proportion of all women who reported that their most recent mammogram was for screening (i.e., part of a routine checkup) was 53.1% in 1989 and 76.9% in 1997 (p for trend <0.01). The proportion increased in each state, and the range across states shifted from 42.1%–65.3% in 1989 to 67.4%–85.0% in 1997. In 1989, an age-adjusted total of 54.3% of women reported receiving a mammogram within the previous 2 years; in 1997, 71.3% did so (p for trend <0.01). This proportion increased in each state, and the range across states shifted from 43.8%–64.5% in 1989 to 60.8%–77.9% in 1997.

For all three measures of mammography use — ever (Table 3), as part of a routine checkup (Table 4), and within the past 2 years (Table 5) — there was an increasing

TABLE 1. Characteristics of women in 38 states* — Behavioral Risk Factor Surveillance System (BRFSS), 1989–1997

Characteristic	1989 %	(SE†)	1990 %	(SE)	1991 %	(SE)	1992 %	(SE)	1993 %	(SE)	1994 %	(SE)	1995 %	(SE)	1996 %	(SE)	1997 %	(SE)
Age (yrs)																		
<40	46.5	(0.4)	46.4	(0.4)	46.3	(0.4)	46.5	(0.4)	45.2	(0.4)	45.0	(0.2)	43.4	(0.4)	42.0	(0.3)	41.4	(0.3)
40–49	16.0	(0.3)	16.6	(0.3)	16.1	(0.3)	16.5	(0.2)	17.2	(0.3)	17.0	(0.2)	18.9	(0.3)	19.0	(0.2)	19.1	(0.2)
50–59	12.2	(0.3)	11.9	(0.3)	11.9	(0.3)	11.4	(0.2)	11.9	(0.2)	12.0	(0.2)	12.2	(0.2)	12.8	(0.2)	13.3	(0.2)
60–69	13.0	(0.3)	12.6	(0.3)	12.5	(0.3)	12.1	(0.2)	11.9	(0.2)	12.0	(0.2)	11.7	(0.2)	12.0	(0.2)	11.7	(0.2)
≥70	12.3	(0.3)	12.0	(0.2)	12.6	(0.2)	13.0	(0.2)	13.3	(0.2)	13.0	(0.2)	13.2	(0.2)	13.8	(0.2)	14.0	(0.2)
Don't know/refused	0.0	(0.0)	0.7	(0.1)	0.6	(0.1)	0.6	(0.0)	0.6	(0.1)	0.5	(0.1)	0.5	(0.0)	0.4	(0.0)	0.5	(0.0)
Race																		
White	84.0	(0.4)	85.7	(0.3)	85.6	(0.3)	85.3	(0.3)	84.9	(0.3)	84.8	(0.3)	83.8	(0.3)	82.6	(0.3)	82.1	(0.3)
Black	10.2	(0.3)	10.2	(0.3)	10.3	(0.3)	9.9	(0.2)	9.4	(0.2)	9.4	(0.2)	10.3	(0.2)	10.8	(0.2)	10.6	(0.2)
Asian American or Pacific Islander	2.3	(0.2)	1.8	(0.1)	2.0	(0.1)	2.0	(0.1)	2.0	(0.1)	1.9	(0.1)	2.6	(0.1)	2.5	(0.1)	3.0	(0.2)
American Indian or Alaska Native	0.6	(0.1)	0.7	(0.1)	0.7	(0.1)	0.8	(0.1)	0.8	(0.1)	0.7	(0.1)	1.0	(0.1)	1.1	(0.1)	1.2	(0.1)
Other	2.9	(0.2)	1.5	(0.1)	1.4	(0.1)	1.8	(0.1)	2.9	(0.1)	3.1	(0.1)	2.1	(0.1)	2.7	(0.1)	2.6	(0.1)
Don't know/refused	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)	0.2	(0.0)	0.1	(0.0)	0.1	(0.0)	0.4	(0.1)	0.4	(0.0)	0.5	(0.1)
Ethnicity																		
Hispanic	8.0	(0.3)	7.5	(0.3)	8.2	(0.3)	8.4	(0.2)	8.1	(0.2)	7.9	(0.2)	9.5	(0.3)	9.4	(0.2)	9.7	(0.2)
Non-Hispanic	91.8	(0.3)	92.3	(0.3)	91.7	(0.3)	91.5	(0.2)	91.7	(0.2)	91.9	(0.2)	90.1	(0.3)	90.3	(0.2)	89.9	(0.2)
Don't know/refused	0.2	(0.0)	0.2	(0.0)	0.2	(0.0)	0.2	(0.0)	0.2	(0.0)	0.2	(0.0)	0.4	(0.0)	0.3	(0.0)	0.4	(0.0)
Annual household Income																		
<$10,000	14.7	(0.3)	14.0	(0.3)	14.7	(0.3)	14.7	(0.2)	14.0	(0.2)	17.2	(0.3)	7.9	(0.2)	7.3	(0.2)	6.5	(0.2)
$10,000 to <$25,000	29.6	(0.4)	28.6	(0.4)	28.4	(0.3)	28.8	(0.3)	26.6	(0.3)	24.4	(0.3)	26.8	(0.3)	25.1	(0.3)	24.5	(0.3)
$25,000 to $50,000	28.4	(0.3)	28.9	(0.4)	28.8	(0.3)	28.3	(0.3)	29.2	(0.3)	26.2	(0.3)	31.0	(0.3)	30.6	(0.3)	30.1	(0.3)
>$50,000	12.2	(0.3)	14.1	(0.3)	13.8	(0.3)	15.2	(0.3)	17.0	(0.3)	17.5	(0.3)	19.8	(0.3)	21.0	(0.3)	22.0	(0.3)
Don't know/refused	15.1	(0.3)	14.4	(0.3)	14.3	(0.3)	13.0	(0.2)	13.2	(0.2)	14.8	(0.3)	14.7	(0.3)	16.0	(0.2)	16.8	(0.2)
Education (yrs)																		
<12	17.9	(0.3)	16.9	(0.3)	16.3	(0.3)	15.6	(0.3)	15.2	(0.3)	16.3	(0.3)	15.6	(0.3)	14.4	(0.2)	14.0	(0.2)
12	35.9	(0.4)	35.8	(0.4)	35.7	(0.4)	36.2	(0.3)	35.2	(0.3)	33.6	(0.3)	33.9	(0.3)	33.8	(0.3)	33.6	(0.3)
>12	45.9	(0.4)	47.0	(0.4)	47.8	(0.4)	48.0	(0.3)	49.5	(0.3)	49.9	(0.3)	50.3	(0.4)	51.5	(0.3)	52.1	(0.3)
Don't know/refused	0.3	(0.0)	0.3	(0.0)	0.3	(0.1)	0.2	(0.0)	0.2	(0.0)	0.2	(0.0)	0.3	(0.0)	0.3	(0.0)	0.3	(0.0)
Health-care Insurance																		
Yes	§		§		86.0	(0.3)	85.7	(0.3)	87.4	(0.3)	87.4	(0.3)	88.0	(0.3)	86.5	(0.2)	86.7	(0.2)
No					13.5	(0.3)	14.1	(0.3)	12.4	(0.3)	12.4	(0.0)	11.7	(0.3)	13.2	(0.2)	13.1	(0.2)
Don't know/refused					0.5	(0.1)	0.3	(0.0)	0.2	(0.0)	0.2	(0.0)	0.3	(0.0)	0.3	(0.1)	0.2	(0.1)
Had hysterectomy																		
Yes	¶		¶		21.0	(0.3)	20.2	(0.3)	20.9	(0.3)	20.7	(0.3)	20.8	(0.3)	21.2	(0.3)	21.1	(0.2)
No					78.7	(0.3)	79.4	(0.3)	78.7	(0.3)	78.8	(0.3)	78.7	(0.3)	78.1	(0.3)	78.0	(0.2)
Don't know/refused					0.3	(0.0)	0.4	(0.1)	0.5	(0.0)	0.6	(0.0)	0.4	(0.0)	0.7	(0.1)	0.8	(0.1)

* Alabama, Arizona, California, Connecticut, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, New Hampshire, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, and Wisconsin.
† Standard error of the estimate.
§ Question not asked in 1989 or 1990.
¶ Question not asked in all 38 states.

FIGURE 2. Percentage* of women aged ≥40 years who reported ever having a mammogram, having their most recent mammogram as part of a routine checkup, and having a mammogram within the past 2 years, 38 states — Behavioral Risk Factor Surveillance System (BRFSS), 1989–1997
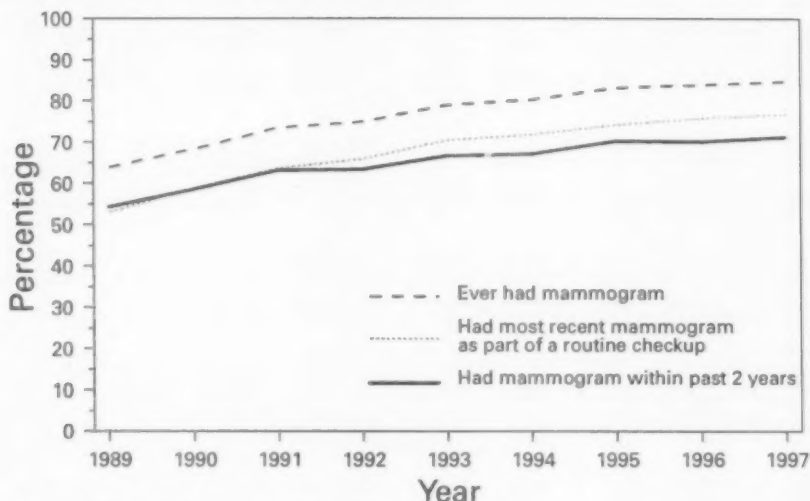
*Adjusted to the 1989 BRFSS age distribution for women.

trend over the 9 survey years among all sociodemographic subgroups (p for trend <0.01) except for American Indians and Alaska Natives. These trends are generally characterized by substantial increases from year to year in the first 6–7 years and modest or no increases for the final 2–3 years.

Differences in mammography use between sociodemographic subgroups were similar for the three measures (Tables 3–5). From 1989 through 1997, women aged 50–69 years were almost always more likely to report having received a mammogram than were the youngest or the oldest women. Women aged ≥70 years were consistently least likely to have received a mammogram within the past 2 years during 1989–1995. In 1996 and 1997, however, women aged 40–49 years were the least likely to have received a timely mammogram. From 1989 through 1997, mammography use was almost always lower among Hispanic women than non-Hispanic women. Reported differences between white and black women were minimal for all years, and in 1996 and 1997, the proportions reporting having had a mammography were about equal. For all 9 years, mammography use was lowest at the lowest levels of annual household income and education and increased as income and education increased. Women without health-care insurance were consistently less likely than those with insurance to have received mammograms. The proportion of uninsured women who reported receiving a mammogram within the previous 2 years did not substantially increase until 1996.

TABLE 2. Number of women aged ≥40 years participating and the percentage who reported ever having a mammogram, having their most recent mammogram as part of a routine checkup, and having a mammogram within the past 2 years, by state — Behavioral Risk Factor Surveillance System (BRFSS), 1989 and 1997

State	No. 1989	No. 1997	Ever had mammogram 1989 Unadjusted % (SE†)	Adjusted* % (SE)	Ever had mammogram 1997 Unadjusted % (SE)	Adjusted % (SE)	Had most recent mammogram as part of routine checkup 1989 Unadjusted % (SE)	Adjusted % (SE)	1997 Unadjusted % (SE)	Adjusted % (SE)	Had mammogram within past 2 years 1989 Unadjusted % (SE)	Adjusted % (SE)	1997 Unadjusted % (SE)	Adjusted % (SE)
Alabama	590	851	54.6 (2.3)	54.4 (2.2)	86.3 (1.3)	86.4 (1.3)	44.0 (2.3)	44.0 (2.3)	77.9 (1.5)	78.1 (1.5)	49.2 (2.2)	49.1 (2.2)	69.7 (1.7)	69.6 (1.7)
Arizona	455	643	61.4 (2.6)	61.5 (2.4)	77.5 (2.6)	77.5 (2.6)	50.2 (2.6)	50.3 (2.5)	75.5 (2.5)	75.4 (2.6)	52.2 (2.6)	52.3 (2.5)	71.5 (2.6)	71.3 (2.7)
California	632	1,347	68.0 (2.3)	68.9 (2.3)	87.8 (1.1)	88.7 (1.0)	59.6 (2.4)	60.8 (2.3)	80.4 (1.3)	81.3 (1.2)	57.1 (2.4)	57.9 (2.4)	73.3 (1.4)	73.9 (1.4)
Connecticut	437	793	73.1 (2.4)	72.4 (2.4)	85.9 (1.5)	86.4 (1.4)	62.8 (2.6)	62.2 (2.6)	79.5 (1.7)	79.9 (1.6)	63.0 (2.6)	62.7 (2.6)	73.4 (1.8)	74.3 (1.7)
Florida	588	1,336	61.6 (2.1)	61.7 (2.2)	87.0 (1.0)	86.9 (1.0)	47.7 (2.3)	47.9 (2.3)	77.6 (1.3)	77.2 (1.3)	53.1 (2.2)	52.7 (2.2)	75.6 (1.3)	75.6 (1.3)
Georgia	480	726	63.0 (2.4)	62.8 (2.3)	87.1 (1.4)	87.6 (1.3)	51.7 (2.4)	51.6 (2.3)	80.6 (1.6)	81.2 (1.6)	53.3 (2.5)	53.3 (2.5)	72.1 (2.0)	71.9 (1.9)
Hawaii	504	752	69.2 (2.4)	68.2 (2.3)	88.3 (1.5)	89.2 (1.3)	60.6 (2.6)	60.0 (2.4)	76.3 (2.1)	77.1 (2.0)	60.2 (2.5)	58.6 (2.4)	76.7 (1.8)	77.4 (1.8)
Idaho	597	1,749	59.4 (2.3)	59.8 (2.2)	81.1 (1.3)	81.3 (1.2)	48.5 (2.3)	48.7 (2.3)	75.2 (1.5)	75.6 (1.5)	49.8 (2.3)	50.0 (2.3)	60.4 (1.5)	60.8 (1.4)
Illinois	590	995	61.8 (2.3)	62.0 (2.3)	84.3 (1.3)	84.8 (1.2)	50.0 (2.3)	50.3 (2.3)	75.2 (1.5)	75.6 (1.5)	51.1 (2.3)	51.6 (2.3)	69.0 (1.6)	69.5 (1.6)
Indiana	720	789	57.2 (2.0)	57.2 (2.0)	80.6 (1.7)	80.8 (1.6)	42.9 (2.0)	43.2 (2.0)	70.2 (1.9)	70.5 (1.9)	46.7 (2.1)	46.6 (2.0)	64.6 (1.9)	65.5 (1.8)
Iowa	460	1,411	55.8 (2.6)	56.2 (2.5)	81.3 (1.2)	82.1 (1.1)	46.5 (2.6)	46.8 (2.5)	72.7 (1.3)	73.4 (1.3)	48.3 (2.6)	48.4 (2.6)	65.5 (1.4)	67.2 (1.4)
Kentucky	652	1,463	58.0 (2.1)	57.7 (2.1)	79.7 (1.2)	79.7 (1.2)	47.2 (2.1)	46.9 (2.1)	71.3 (1.4)	71.3 (1.4)	50.4 (2.1)	50.1 (2.1)	66.9 (1.4)	67.2 (1.4)
Maine	393	599	63.2 (2.6)	63.8 (2.6)	87.6 (1.4)	88.1 (1.4)	52.7 (2.6)	53.2 (2.6)	79.9 (1.7)	80.4 (1.6)	55.0 (2.7)	55.7 (2.6)	73.8 (1.9)	74.5 (1.9)
Maryland	553	1,544	67.2 (2.2)	66.0 (2.1)	86.7 (1.2)	86.2 (1.2)	58.1 (2.4)	56.9 (2.3)	78.5 (1.4)	77.9 (1.4)	60.4 (2.2)	59.5 (2.1)	78.4 (1.4)	77.9 (1.3)
Massachusetts	356	564	71.4 (2.8)	71.7 (2.8)	85.3 (1.7)	86.1 (1.5)	61.6 (3.0)	61.4 (3.0)	79.9 (1.9)	81.0 (1.8)	64.2 (3.0)	64.5 (3.0)	75.8 (2.1)	76.9 (2.0)
Michigan	718	863	74.0 (1.7)	73.9 (1.7)	88.8 (1.1)	88.9 (1.1)	63.3 (2.0)	63.2 (2.0)	79.6 (1.5)	79.8 (1.5)	63.9 (2.0)	63.8 (1.9)	77.2 (1.5)	77.5 (1.5)
Minnesota	1,013	1,604	73.0 (1.5)	73.3 (1.5)	83.2 (1.7)	84.2 (1.6)	65.2 (1.6)	65.3 (1.6)	75.3 (1.1)	76.5 (1.1)	63.6 (1.6)	64.0 (1.6)	69.7 (1.2)	71.6 (1.2)
Missouri	519	701	53.3 (2.4)	54.7 (2.4)	82.4 (1.7)	82.9 (1.6)	46.7 (2.3)	48.0 (2.4)	74.3 (1.9)	75.0 (1.9)	48.3 (2.4)	49.7 (2.4)	65.8 (2.1)	66.2 (2.1)
Montana	407	686	60.1 (2.6)	60.3 (2.7)	82.6 (1.5)	82.4 (1.6)	49.7 (2.7)	49.7 (2.6)	74.4 (1.8)	74.6 (1.8)	49.8 (2.7)	49.9 (2.7)	66.9 (1.9)	67.3 (1.9)
Nebraska	467	1,047	52.0 (2.5)	52.7 (2.5)	79.2 (1.8)	80.4 (1.7)	43.3 (2.5)	43.7 (2.5)	71.0 (1.9)	72.5 (1.8)	42.7 (2.5)	43.8 (2.5)	66.5 (2.0)	68.1 (1.8)
New Hampshire	412	555	68.3 (2.5)	67.5 (2.7)	85.4 (1.6)	85.4 (1.5)	62.1 (2.6)	60.7 (2.6)	77.4 (1.9)	77.9 (1.9)	62.4 (2.6)	61.8 (2.7)	73.7 (2.0)	74.1 (1.9)
New Mexico	365	643	62.2 (3.0)	61.8 (2.9)	80.4 (1.7)	80.7 (1.7)	53.1 (3.1)	53.0 (3.0)	71.1 (2.0)	71.4 (2.0)	56.9 (2.9)	56.5 (2.9)	64.6 (2.0)	65.1 (2.0)
New York	435	1,172	62.1 (2.8)	61.9 (2.7)	86.6 (1.1)	86.8 (1.1)	51.8 (2.8)	51.5 (2.7)	78.1 (1.4)	78.3 (1.3)	51.5 (2.9)	51.4 (2.8)	75.2 (1.5)	75.5 (1.4)
North Carolina	614	1,318	61.2 (2.3)	61.0 (2.2)	85.0 (1.1)	85.3 (1.0)	50.2 (2.3)	50.2 (2.2)	77.5 (1.3)	77.9 (1.3)	52.9 (2.4)	52.6 (2.4)	71.4 (1.4)	71.6 (1.4)
North Dakota	532	649	65.1 (2.3)	65.2 (2.3)	84.4 (1.5)	84.6 (1.5)	56.4 (2.3)	56.6 (2.4)	76.0 (1.8)	76.1 (1.8)	59.1 (2.3)	59.4 (2.4)	70.7 (1.9)	71.3 (1.9)
Ohio	482	1,248	64.0 (2.4)	63.9 (2.3)	83.5 (1.4)	83.2 (1.4)	52.5 (2.5)	52.3 (2.5)	77.2 (1.6)	76.8 (1.6)	53.8 (2.5)	53.8 (2.4)	71.6 (1.8)	71.1 (1.7)
Oklahoma	430	673	59.8 (2.5)	59.9 (2.5)	74.1 (1.9)	74.5 (1.8)	46.7 (2.7)	46.8 (2.7)	67.6 (2.0)	67.4 (2.0)	50.0 (2.6)	49.8 (2.6)	61.7 (2.0)	62.2 (2.0)
Oregon	608	1,229	70.4 (2.0)	70.7 (2.0)	87.3 (1.1)	87.9 (1.0)	41.5 (2.2)	42.1 (2.2)	79.0 (1.3)	79.5 (1.3)	57.3 (2.2)	57.2 (2.2)	72.8 (1.4)	73.7 (1.3)
Pennsylvania	618	1,355	61.7 (2.1)	62.4 (2.1)	81.3 (1.2)	81.7 (1.2)	50.3 (2.3)	50.8 (2.2)	74.5 (1.3)	74.7 (1.3)	52.6 (2.2)	53.4 (2.1)	68.5 (1.4)	68.9 (1.4)

TABLE 2. Number of women aged ≥40 years participating and the percentage who reported ever having a mammogram, having their most recent mammogram as part of a routine checkup, and having a mammogram within the past 2 years, by state — Behavioral Risk Factor Surveillance System (BRFSS), 1989 and 1997 — Continued

| | No. | | Ever had mammogram | | | | Had most recent mammogram as part of routine checkup | | | | Had mammogram within past 2 years | | | |
| | | | 1989 | | 1997 | | 1989 | | 1997 | | 1989 | | 1997 | |
State	1989	1997	Unadjusted % (SE†)	Adjusted* % (SE)	Unadjusted % (SE)	Adjusted % (SE)	Unadjusted % (SE)	Adjusted % (SE)	Unadjusted % (SE)	Adjusted % (SE)	Unadjusted % (SE)	Adjusted % (SE)	Unadjusted % (SE)	Adjusted % (SE)
South Carolina	634	817	58.2 (2.2)	58.6 (2.1)	89.0 (1.2)	89.0 (1.2)	48.2 (2.1)	48.3 (2.1)	85.2 (1.4)	85.0 (1.4)	50.4 (2.2)	50.4 (2.1)	74.4 (1.7)	73.9 (1.6)
South Dakota	555	789	60.8 (2.3)	60.6 (2.3)	84.5 (1.5)	84.8 (1.5)	52.1 (2.3)	52.0 (2.4)	78.0 (1.7)	78.5 (1.7)	47.2 (2.3)	47.3 (2.3)	68.3 (1.9)	68.9 (1.9)
Tennessee	837	1,200	56.2 (1.9)	56.2 (1.9)	79.9 (1.4)	80.2 (1.3)	45.7 (1.9)	45.7 (1.9)	70.6 (1.5)	70.8 (1.5)	48.2 (1.9)	48.4 (1.8)	68.0 (1.5)	68.5 (1.5)
Texas	454	804	67.0 (2.4)	67.1 (2.4)	81.6 (1.5)	81.6 (1.5)	56.4 (2.6)	56.5 (2.6)	73.9 (1.7)	73.9 (1.7)	54.3 (2.6)	54.4 (2.6)	64.3 (1.9)	64.2 (1.9)
Utah	524	861	64.0 (2.3)	64.1 (2.2)	81.0 (1.8)	82.0 (1.8)	49.8 (2.4)	50.4 (2.3)	72.0 (2.1)	72.9 (2.1)	51.0 (2.5)	50.9 (2.5)	64.2 (2.2)	66.0 (2.2)
Virginia	406	1,291	66.3 (2.8)	65.2 (2.7)	84.9 (1.4)	84.8 (1.3)	54.1 (2.9)	53.5 (2.8)	76.4 (1.7)	76.0 (1.6)	58.4 (2.9)	57.0 (2.8)	69.6 (1.9)	69.6 (1.7)
Washington	474	1,241	66.5 (2.3)	67.2 (2.2)	87.4 (1.0)	87.8 (1.0)	55.7 (2.5)	56.4 (2.4)	78.7 (1.3)	79.3 (1.3)	56.5 (2.4)	57.2 (2.4)	69.3 (1.5)	69.8 (1.5)
West Virginia	637	983	56.3 (2.1)	55.8 (2.1)	80.2 (1.4)	80.2 (1.4)	45.4 (2.2)	45.0 (2.2)	69.4 (1.6)	69.5 (1.6)	45.8 (2.2)	45.2 (2.2)	66.1 (1.6)	66.2 (1.6)
Wisconsin	363	736	67.4 (2.7)	67.7 (2.6)	82.3 (1.6)	82.4 (1.7)	58.0 (2.8)	58.3 (2.7)	73.1 (1.9)	73.4 (1.9)	56.3 (2.8)	57.0 (2.8)	65.7 (2.8)	66.9 (2.0)
Total	20,511	38,027	63.9 (0.5)	63.9 (0.5)	84.5 (0.3)	84.8 (0.3)	53.1 (0.6)	53.1 (0.6)	76.7 (0.3)	76.9 (0.3)	54.3 (0.6)	54.3 (0.6)	70.9 (0.4)	71.3 (0.4)
Median			62.1	62.2	84.4	84.7	51.0	51.1	76.1	76.3	53.0	53.0	69.6	69.7
Low			52.0 (2.5)	52.7 (2.5)	74.1 (1.9)	74.5 (1.8)	41.5 (2.2)	42.1 (2.2)	67.6 (2.0)	67.4 (2.0)	42.7 (2.5)	43.8 (2.5)	60.4 (1.5)	60.8 (1.4)
High			74.0 (1.7)	73.9 (1.7)	89.0 (1.2)	89.2 (1.3)	65.2 (1.6)	65.3 (1.6)	85.2 (1.4)	85.0 (1.4)	64.2 (3.0)	64.5 (3.0)	78.4 (1.4)	77.9 (1.3)

* Adjusted to the 1989 BRFSS age distribution for women.
† Standard error of the estimate.

TABLE 3. Percentage* of women aged ≥40 years who reported ever having a mammogram, 38 states — Behavioral Risk Factor Surveillance System (BRFSS), 1989–1997

Characteristic	1989 %	(±95% CI†)	1990 %	(±95% CI)	1991 %	(±95% CI)	1992 %	(±95% CI)	1993 %	(±95% CI)	1994 %	(±95% CI)	1995 %	(±95% CI)	1996 %	(±95% CI)	1997 %	(±95% CI)
Age (yrs)																		
40–49	63.3	(2.0)	68.6	(1.8)	74.0	(1.6)	75.6	(1.3)	77.4	(1.3)	78.2	(1.3)	80.4	(1.3)	80.6	(1.1)	80.4	(1.1)
50–59	71.1	(2.2)	72.2	(2.2)	78.5	(1.8)	79.4	(1.6)	83.2	(1.4)	84.0	(1.4)	87.6	(1.3)	87.7	(1.1)	89.2	(1.1)
60–69	65.2	(2.2)	70.7	(2.0)	74.3	(1.8)	75.7	(1.6)	81.4	(1.4)	83.1	(1.4)	86.2	(1.2)	86.6	(1.2)	88.5	(1.1)
≥70	56.2	(2.0)	61.3	(1.9)	67.2	(1.7)	69.2	(1.5)	74.4	(1.4)	76.2	(1.4)	79.1	(1.3)	81.8	(1.2)	82.3	(1.1)
Race																		
White	64.5	(1.1)	68.8	(1.0)	73.9	(0.9)	75.9	(0.8)	79.7	(0.7)	80.7	(0.7)	83.4	(0.7)	84.4	(0.6)	84.9	(0.6)
Black	63.8	(3.6)	66.4	(3.2)	72.0	(2.8)	70.1	(2.8)	75.4	(2.4)	78.8	(2.3)	81.7	(2.1)	83.7	(1.9)	85.1	(1.7)
Asian American or Pacific Islander	48.2	(8.2)	60.8	(7.9)	65.3	(7.5)	70.9	(6.4)	75.3	(6.5)	79.2	(5.4)	81.8	(4.7)	83.9	(5.6)	86.3	(5.0)
American Indian or Alaska Native	62.5	(12.4)	59.7	(11.2)	78.0	(8.7)	75.7	(7.8)	79.7	(6.6)	66.6	(8.0)	85.2	(6.1)	75.3	(7.4)	78.7	(7.9)
Other	54.8	(12.6)	61.4	(10.6)	50.5	(10.3)	59.1	(8.5)	72.9	(5.9)	79.1	(5.7)	79.4	(6.0)	75.1	(7.2)	84.1	(5.3)
Race and age (yrs)																		
White																		
40–49	65.0	(1.9)	69.5	(1.9)	74.1	(1.7)	76.8	(1.4)	78.5	(1.4)	79.0	(1.4)	80.5	(1.4)	81.4	(1.1)	80.0	(1.2)
50–59	70.9	(2.3)	72.7	(2.3)	79.1	(1.9)	80.7	(1.6)	84.1	(1.5)	84.2	(1.5)	87.9	(1.4)	88.1	(1.2)	89.9	(1.0)
60–69	66.2	(2.2)	71.5	(2.1)	75.3	(1.8)	76.2	(1.7)	81.6	(1.5)	83.8	(1.4)	86.2	(1.3)	86.9	(1.2)	88.8	(1.1)
≥70	55.6	(2.1)	61.1	(2.0)	67.1	(1.8)	69.7	(1.6)	74.7	(1.4)	76.0	(1.4)	79.6	(1.4)	81.8	(1.2)	82.3	(1.1)
Black																		
40–49	58.7	(7.6)	66.2	(5.7)	72.9	(4.9)	69.3	(4.5)	75.9	(3.8)	74.4	(3.9)	79.8	(3.6)	78.0	(3.8)	82.4	(2.8)
50–59	73.5	(6.1)	68.5	(6.7)	75.9	(5.8)	73.0	(5.7)	78.1	(5.1)	81.0	(4.7)	86.9	(3.4)	88.7	(3.4)	87.2	(3.2)
60–69	64.2	(7.1)	67.2	(6.4)	71.1	(6.1)	75.1	(5.9)	77.7	(4.9)	80.7	(4.6)	84.8	(4.4)	86.4	(3.7)	86.9	(3.9)
≥70	60.3	(7.4)	63.8	(6.8)	68.1	(6.1)	63.0	(6.4)	69.3	(5.7)	80.2	(5.1)	75.9	(5.0)	83.2	(4.4)	84.7	(4.0)
Ethnicity																		
Hispanic	56.0	(6.4)	63.6	(5.2)	68.0	(4.6)	67.2	(4.5)	72.4	(4.0)	73.3	(3.8)	82.1	(3.2)	80.4	(3.2)	82.0	(3.0)
Non-Hispanic	64.5	(1.0)	68.6	(1.0)	74.0	(0.9)	75.6	(0.8)	79.5	(0.7)	80.7	(0.7)	83.3	(0.6)	84.3	(0.6)	85.1	(0.5)
Annual household income																		
<$10,000	51.6	(3.2)	57.2	(2.8)	62.4	(2.6)	62.2	(2.5)	66.6	(2.3)	71.3	(1.9)	73.3	(3.6)	73.1	(2.8)	76.7	(2.8)
$10,000 to <$25,000	60.8	(2.0)	62.9	(1.9)	68.3	(1.7)	71.3	(1.5)	74.4	(1.4)	76.9	(1.4)	77.6	(1.5)	78.8	(1.3)	79.0	(1.3)
$25,000 to $50,000	70.0	(2.5)	75.7	(2.1)	80.1	(1.8)	80.5	(1.7)	83.7	(1.5)	84.0	(1.4)	85.4	(1.2)	86.6	(1.0)	87.5	(1.0)
>$50,000	78.7	(4.5)	80.7	(4.0)	85.2	(2.8)	85.8	(2.2)	90.0	(1.7)	89.7	(2.0)	92.3	(1.4)	93.4	(1.2)	90.3	(1.7)
Education (yrs)																		
<12	53.6	(2.6)	56.6	(2.5)	61.4	(2.4)	61.4	(2.1)	67.1	(2.1)	70.4	(2.0)	74.4	(2.0)	76.2	(1.9)	75.9	(1.9)
12	63.2	(1.7)	67.9	(1.6)	72.5	(1.5)	74.5	(1.3)	78.1	(1.2)	78.7	(1.1)	81.8	(1.1)	81.8	(1.0)	83.9	(0.9)
>12	70.6	(1.5)	74.6	(1.5)	79.9	(1.2)	81.6	(1.1)	84.4	(0.9)	85.8	(0.9)	87.7	(0.9)	88.4	(0.7)	88.6	(0.7)
Health-care insurance																		
Yes	§		§		75.4	(0.9)	77.4	(0.8)	81.1	(0.7)	82.2	(0.7)	84.7	(0.6)	85.7	(0.5)	86.5	(0.5)
No	§		§		55.7	(3.8)	53.5	(3.9)	55.8	(4.3)	59.9	(4.2)	64.9	(4.5)	71.1	(3.3)	68.5	(3.7)
Total	63.9	(1.1)	68.3	(1.0)	73.5	(0.9)	75.0	(0.8)	79.0	(0.7)	80.3	(0.7)	83.2	(0.6)	84.0	(0.6)	84.8	(0.5)

* Adjusted to the 1989 BRFSS age distribution for women.
† Confidence interval.
§ Question not asked in 1989 or 1990.

TABLE 4. Percentage* of women aged ≥40 years who reported having their most recent mammogram as part of a routine checkup, 38 states — Behavioral Risk Factor Surveillance System (BRFSS), 1989–1997

Characteristic	1989 %	(±95% CI†)	1990 %	(±95% CI)	1991 %	(±95% CI)	1992 %	(±95% CI)	1993 %	(±95% CI)	1994 %	(±95% CI)	1995 %	(±95% CI)	1996 %	(±95% CI)	1997 %	(±95% CI)
Age (yrs)																		
40–49	49.5	(2.0)	57.7	(1.9)	63.5	(1.7)	64.9	(1.5)	67.8	(1.4)	69.2	(1.4)	70.5	(1.6)	71.2	(1.2)	71.9	(1.2)
50–59	61.2	(2.3)	62.0	(2.3)	67.5	(2.1)	70.9	(1.7)	75.5	(1.6)	75.9	(1.6)	78.5	(1.5)	79.9	(1.4)	81.1	(1.3)
60–69	54.7	(2.2)	62.2	(2.1)	65.3	(1.9)	67.6	(1.8)	72.9	(1.6)	74.6	(1.6)	77.5	(1.5)	79.6	(1.4)	80.4	(1.4)
≥70	47.8	(2.1)	53.5	(2.0)	58.3	(1.8)	60.8	(1.6)	66.5	(1.5)	68.4	(1.5)	71.5	(1.5)	74.2	(1.3)	75.5	(1.2)
Race																		
White	53.1	(1.1)	59.1	(1.1)	63.7	(1.0)	66.6	(0.9)	70.8	(0.8)	72.0	(0.8)	74.0	(0.8)	76.0	(0.7)	76.8	(0.7)
Black	57.4	(3.8)	59.2	(3.3)	63.9	(3.1)	63.0	(3.0)	69.5	(2.6)	72.0	(2.5)	76.4	(2.3)	77.4	(2.2)	78.9	(2.1)
Asian American or Pacific Islander	41.6	(7.9)	57.3	(8.0)	60.5	(8.4)	62.0	(7.8)	74.2	(6.5)	73.4	(5.9)	76.0	(5.6)	78.8	(5.8)	80.7	(5.2)
American Indian or Alaska Native	55.4	(12.8)	48.5	(11.1)	70.2	(10.0)	64.3	(8.5)	68.8	(7.8)	58.2	(8.6)	71.2	(9.3)	68.6	(8.0)	68.4	(8.3)
Other	49.4	(12.4)	54.0	(10.9)	44.7	(9.2)	54.3	(8.7)	66.6	(6.3)	69.4	(6.7)	71.3	(6.5)	67.0	(7.5)	76.6	(5.5)
Race and age (yrs)																		
White																		
40–49	50.5	(2.0)	58.2	(2.0)	63.1	(1.9)	65.5	(1.6)	68.6	(1.5)	69.5	(1.5)	70.1	(1.8)	71.1	(1.3)	71.2	(1.3)
50–59	60.8	(2.4)	62.4	(2.4)	67.7	(2.2)	71.9	(1.8)	76.0	(1.7)	76.2	(1.7)	78.4	(1.7)	80.0	(1.4)	81.4	(1.3)
60–69	54.8	(2.3)	62.7	(2.2)	66.0	(2.0)	68.0	(1.8)	72.6	(1.7)	74.9	(1.7)	76.8	(1.6)	79.3	(1.5)	80.4	(1.4)
≥70	46.6	(2.1)	52.9	(2.1)	58.1	(1.9)	61.3	(1.6)	66.4	(1.6)	68.1	(1.6)	71.8	(1.5)	74.2	(1.4)	75.4	(1.3)
Black																		
40–49	51.8	(7.4)	57.4	(5.7)	64.7	(5.4)	61.9	(5.5)	67.9	(4.3)	67.4	(4.3)	73.6	(4.2)	70.2	(4.2)	76.7	(3.3)
50–59	62.4	(7.2)	59.4	(7.1)	65.1	(7.0)	66.5	(6.1)	73.6	(5.4)	74.3	(5.1)	81.7	(4.0)	83.0	(4.1)	81.1	(3.7)
60–69	59.5	(7.4)	60.6	(6.6)	65.0	(6.4)	68.6	(6.5)	72.7	(5.4)	75.8	(5.1)	80.6	(4.8)	83.2	(4.0)	79.9	(4.9)
≥70	57.5	(7.5)	59.8	(7.1)	60.5	(6.6)	55.1	(6.5)	64.1	(5.8)	71.8	(5.6)	70.3	(5.4)	75.3	(5.2)	78.6	(4.8)
Ethnicity																		
Hispanic	45.2	(6.2)	56.3	(5.3)	60.3	(4.8)	59.4	(4.7)	66.0	(4.2)	66.3	(4.1)	73.2	(3.8)	71.7	(3.7)	77.2	(3.2)
Non-Hispanic	53.6	(1.1)	59.0	(1.0)	64.0	(0.9)	66.5	(0.8)	70.8	(0.8)	72.2	(0.8)	74.4	(0.8)	76.3	(0.7)	77.0	(0.6)
Annual household income																		
<$10,000	41.8	(3.0)	47.1	(2.9)	51.1	(2.7)	53.0	(2.5)	57.8	(2.4)	61.6	(2.1)	62.4	(4.3)	62.9	(3.1)	65.8	(3.1)
$10,000 to <$25,000	48.8	(2.1)	53.7	(1.9)	58.2	(1.8)	61.7	(1.6)	65.1	(1.6)	69.0	(1.6)	69.6	(1.5)	70.1	(1.5)	70.7	(1.5)
$25,000 to $50,000	59.1	(2.6)	66.2	(2.3)	70.1	(2.1)	71.2	(1.8)	75.3	(1.6)	75.0	(1.7)	76.1	(1.4)	78.1	(1.3)	80.1	(1.2)
>$50,000	68.9	(4.7)	71.7	(4.2)	75.5	(3.2)	75.6	(2.8)	81.1	(2.3)	80.9	(2.5)	82.7	(2.2)	86.2	(1.6)	82.4	(2.1)
Education (yrs)																		
<12	43.2	(2.5)	48.1	(2.5)	51.7	(2.4)	53.1	(2.2)	58.2	(2.2)	61.9	(2.1)	66.4	(2.2)	65.7	(2.1)	67.7	(2.1)
12	52.0	(1.8)	58.6	(1.7)	62.0	(1.6)	65.9	(1.4)	69.7	(1.3)	70.2	(1.3)	72.8	(1.4)	74.3	(1.1)	76.1	(1.1)
>12	59.6	(1.7)	64.6	(1.6)	70.4	(1.4)	71.7	(1.3)	75.6	(1.1)	77.4	(1.1)	78.6	(1.1)	80.5	(0.9)	80.4	(0.9)
Health-care insurance																		
Yes	§		§		65.5	(1.0)	68.4	(0.8)	72.5	(0.8)	73.8	(0.8)	75.7	(0.8)	77.7	(0.7)	78.6	(0.6)
No					47.4	(3.8)	44.6	(3.8)	49.6	(4.3)	51.9	(4.2)	56.3	(5.0)	62.1	(3.7)	61.7	(3.7)
Total	53.1	(1.1)	58.8	(1.0)	63.7	(0.9)	66.0	(0.8)	70.5	(0.8)	71.9	(0.8)	74.3	(0.8)	75.9	(0.7)	76.9	(0.6)

* Adjusted to the 1989 BRFSS age distribution for women.
† Confidence interval.
§ Question not asked in 1989 or 1990.

TABLE 5. Percentage* of women aged ≥40 years who reported having a mammogram within the past 2 years, 38 states — Behavioral Risk Factor Surveillance System (BRFSS), 1989–1997

Characteristic	1989 %	(±95% CI†)	1990 %	(±95% CI)	1991 %	(±95% CI)	1992 %	(±95% CI)	1993 %	(±95% CI)	1994 %	(±95% CI)	1995 %	(±95% CI)	1996 %	(±95% CI)	1997 %	(±95% CI)
Age (yrs)																		
40–49	54.3	(2.1)	59.5	(1.9)	64.3	(1.7)	63.6	(1.5)	65.9	(1.4)	64.1	(1.5)	66.1	(1.6)	64.0	(1.3)	65.0	(1.3)
50–59	61.3	(2.3)	63.0	(2.3)	68.2	(2.0)	68.7	(1.8)	71.5	(1.8)	72.2	(1.7)	76.8	(1.6)	76.3	(1.5)	78.0	(1.4)
60–69	55.1	(2.2)	61.0	(2.1)	64.2	(2.0)	63.9	(1.8)	69.2	(1.7)	71.7	(1.6)	74.3	(1.6)	75.2	(1.5)	77.1	(1.4)
≥70	46.3	(2.1)	50.2	(2.0)	55.8	(1.8)	57.1	(1.6)	60.2	(1.5)	61.0	(1.6)	64.9	(1.5)	66.7	(1.4)	66.7	(1.3)
Race																		
White	54.7	(1.1)	59.2	(1.1)	63.4	(1.0)	64.2	(0.9)	67.0	(0.9)	67.3	(0.8)	70.2	(0.8)	70.5	(0.7)	71.4	(0.7)
Black	55.7	(3.7)	56.8	(3.4)	62.5	(3.2)	60.2	(3.0)	65.5	(2.7)	67.6	(2.6)	71.2	(2.5)	71.5	(2.4)	72.9	(2.2)
Asian American or Pacific Islander	38.8	(7.1)	55.5	(7.6)	57.8	(7.4)	60.8	(7.0)	66.0	(7.1)	68.6	(6.3)	70.0	(5.4)	66.2	(7.2)	72.5	(7.2)
American Indian or Alaska Native	45.4	(10.9)	50.5	(11.5)	63.4	(9.9)	63.7	(9.2)	66.7	(8.6)	56.0	(8.2)	76.6	(7.9)	56.7	(8.6)	59.9	(8.9)
Other	43.3	(10.8)	45.9	(11.1)	49.1	(10.0)	46.7	(8.2)	60.2	(6.7)	66.0	(6.5)	67.1	(6.9)	62.7	(7.8)	59.7	(7.6)
Race and age (yrs)																		
White																		
40–49	55.7	(2.0)	60.6	(2.0)	63.9	(1.9)	65.0	(1.6)	66.5	(1.6)	64.5	(1.6)	65.6	(1.6)	64.6	(1.4)	64.2	(1.4)
50–59	60.8	(2.5)	63.9	(2.5)	68.9	(2.2)	69.6	(1.9)	71.9	(1.9)	72.0	(1.8)	76.9	(1.7)	76.9	(1.5)	78.8	(1.4)
60–69	55.5	(2.3)	61.6	(2.3)	64.7	(2.1)	64.4	(1.9)	69.4	(1.8)	72.4	(1.7)	73.9	(1.7)	75.4	(1.5)	77.4	(1.5)
≥70	46.2	(2.1)	50.0	(2.1)	55.8	(1.9)	57.4	(1.8)	60.3	(1.6)	60.6	(1.7)	65.3	(1.6)	66.7	(1.4)	66.9	(1.4)
Black																		
40–49	52.9	(7.5)	57.3	(5.9)	64.7	(5.5)	58.5	(5.5)	67.2	(4.2)	64.7	(4.4)	69.9	(4.5)	63.8	(4.4)	71.0	(3.5)
50–59	64.7	(6.9)	56.8	(7.2)	61.9	(6.9)	65.2	(6.1)	70.3	(5.8)	70.8	(5.3)	78.6	(4.3)	77.8	(4.8)	76.3	(4.4)
60–69	57.0	(7.5)	59.3	(6.5)	63.6	(6.4)	62.5	(6.9)	65.2	(6.0)	70.4	(5.3)	74.4	(5.3)	77.0	(4.7)	78.1	(4.6)
≥70	48.8	(7.4)	53.4	(7.3)	59.1	(6.7)	54.9	(6.5)	59.0	(6.0)	65.2	(6.1)	61.9	(5.8)	69.1	(5.2)	66.5	(5.5)
Ethnicity																		
Hispanic	45.2	(6.2)	53.3	(5.3)	57.4	(4.9)	54.2	(4.6)	61.4	(4.3)	61.3	(4.1)	71.8	(3.9)	67.3	(3.8)	67.0	(3.7)
Non-Hispanic	54.9	(1.1)	58.9	(1.0)	63.7	(0.9)	64.0	(0.8)	67.1	(0.8)	67.5	(0.8)	70.3	(0.8)	70.5	(0.7)	71.7	(0.7)
Annual household income																		
<$10,000	42.1	(3.1)	46.3	(2.8)	49.8	(2.8)	48.1	(2.5)	51.3	(2.4)	57.2	(2.1)	59.5	(4.3)	55.0	(3.1)	58.4	(3.2)
$10,000 to <$25,000	50.8	(2.1)	52.2	(2.0)	56.4	(1.8)	59.2	(1.6)	60.5	(1.6)	61.9	(1.6)	63.0	(1.6)	63.2	(1.5)	64.1	(1.5)
$25,000 to $50,000	61.0	(2.7)	66.8	(2.4)	71.6	(2.1)	70.1	(1.9)	73.3	(1.7)	72.6	(1.7)	73.2	(1.7)	73.6	(1.4)	74.6	(1.3)
>$50,000	68.0	(4.6)	73.7	(4.2)	76.7	(3.1)	76.5	(2.6)	80.0	(2.4)	78.8	(2.6)	83.3	(1.8)	81.5	(2.2)	79.1	(2.2)
Education (yrs)																		
<12	44.1	(2.5)	46.6	(2.5)	51.7	(2.4)	48.2	(2.2)	53.3	(2.2)	56.5	(2.2)	61.0	(2.2)	60.0	(2.2)	58.8	(2.2)
12	53.0	(1.8)	58.0	(1.7)	61.2	(1.6)	62.8	(1.4)	65.7	(1.4)	65.1	(1.3)	68.6	(1.3)	68.7	(1.2)	71.0	(1.1)
>12	61.5	(1.7)	65.4	(1.6)	70.3	(1.4)	70.7	(1.3)	73.2	(1.2)	73.6	(1.2)	75.7	(1.2)	75.2	(1.0)	75.9	(0.9)
Health-care insurance																		
Yes	§		§		65.4	(1.0)	66.2	(0.9)	69.4	(0.8)	69.8	(0.8)	72.5	(0.8)	72.6	(0.7)	73.7	(0.7)
No	§		§		42.6	(3.8)	38.5	(3.6)	36.7	(4.2)	40.8	(4.1)	42.9	(4.7)	48.9	(4.2)	50.0	(3.9)
Total	54.3	(1.1)	58.6	(1.0)	63.2	(0.9)	63.4	(0.8)	66.7	(0.8)	67.1	(0.8)	70.3	(0.8)	70.2	(0.7)	71.3	(0.7)

* Adjusted to the 1989 BRFSS age distribution for women.
† Confidence interval.
§ Question not asked in 1989 or 1990.

Mammography plus CBE

The questions addressing CBE were added to the BRFSS in 1990. The age-adjusted proportion of women aged ≥40 years who reported ever having both a mammogram and a CBE rose each year, from 65.2% in 1990 to 79.5% in 1997 (p for trend <0.01) (Figure 3) (Table 6). The proportion of women who reported that both tests were part of a routine examination also rose each year, from 55.0% in 1990 to 70.3% in 1997 (p for trend <0.01). The proportion who reported they received both a mammogram and a CBE within the past 2 years was 65.2% in 1997, an increase from the 55.0% who reported having both procedures in 1990 (p for trend <0.01).

Pap Test

In each year from 1991 through 1997, 91%–93% of women aged ≥18 years with an intact uterine cervix reported ever having had a Pap test (Figure 4). The age-adjusted proportions among the states ranged from 86.6% to 95.1% in 1991 and from 81.8% to 96.8% in 1997 (Table 7). In 1991, <90% of women in five states reported ever having had this screening procedure, and in 1997, <90% of women in only one state did so. For most of the sociodemographic subgroups, the age-adjusted proportions of women who ever received a Pap test were high and changed minimally from 1991 through 1997 (Table 8). In 1997, >90% of women in most subgroups reported ever receiving a Pap test; the exceptions were women aged ≥70 years, Asian American and

FIGURE 3. Percentage* of women aged ≥40 years who reported ever having both a mammogram and clinical breast examination (CBE), having their most recent mammogram and CBE as part of a routine checkup, and having both a mammogram and a CBE within the past 2 years, 38 states — Behavioral Risk Factor Surveillance System (BRFSS), 1990–1997
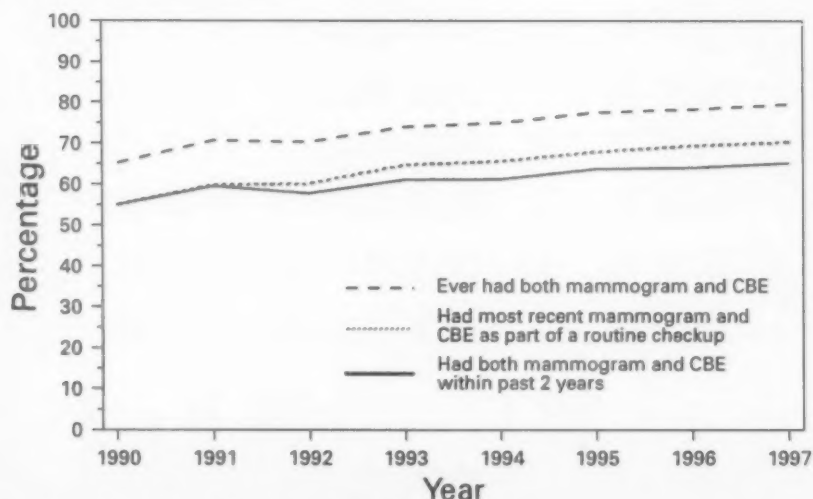
* Adjusted to the 1989 BRFSS age distribution for women.

TABLE 6. Percentage* of women aged ≥40 years who reported ever having both a mammogram and a clinical breast examination (CBE), having their most recent mammogram and CBE as part of a routine checkup, and having both a mammogram and a CBE within the past 2 years, 38 states — Behavioral Risk Factor Surveillance System (BRFSS), 1990–1997

|	1990		1991		1992		1993		1994		1995		1996		1997	
	%	(±95% CI†)	%	(±95% CI)	%	(±95% CI)	%	(±95% CI)	%	(±95% CI)	%	(±95% CI)	%	(±95% CI)	%	(±95% CI)
Ever had both mammogram and CBE	65.2	(1.0)	70.6	(0.9)	70.3	(0.8)	74.0	(0.7)	75.0	(0.7)	77.5	(0.7)	78.3	(0.6)	79.5	(0.6)
Had most recent mammogram and CBE as part of routine checkup	55.0	(1.0)	59.8	(1.0)	60.2	(0.8)	64.7	(0.8)	65.6	(0.8)	67.9	(0.8)	69.4	(0.8)	70.3	(0.7)
Had both mammogram and CBE within past 2 years	55.0	(1.0)	59.5	(1.0)	57.8	(0.8)	61.1	(0.8)	61.3	(0.8)	63.7	(0.8)	64.1	(0.8)	65.2	(0.7)

* Adjusted to the 1989 BRFSS age distribution for women.
† Confidence interval.

Pacific Islander women, women of "other" races, Hispanic women, women with an annual household income of <$10,000, women with <12 years of education, and women without health-care insurance.

Over the 7 survey years, ≥77% of the respondents reported having received a Pap test within the past 2 years (Figure 4). The age-adjusted proportions among the states ranged from 73.2% to 85.0% in 1991 and from 72.4% to 87.2% in 1997 (Table 7). Overall, and for most subgroups, the proportion of women who received a Pap test in the past 2 years was stable over the survey period (Table 9). From 1991 through 1997, women aged <60 years were more likely than older women to report having received a Pap test in the past 2 years. Black women were slightly more likely than white women to have received a recent Pap test; both blacks and whites were consistently more likely than women of "other" races to report having had a recent Pap test. Hispanic women were less likely than non-Hispanic women to have received timely tests. In each year, the likelihood of having had a timely test generally increased with annual household income and with education, and women without health-care insurance were substantially less likely than were women with insurance to have received a timely Pap test. Analyses of trends revealed a minimal but statistically significant increase during 1991–1997 in the overall proportion of women having a timely Pap test. However, most subgroups did not demonstrate a substantial change during these 7 years. Even for subgroups for which significant trends were found (i.e., women aged 50–69 years, white women, black women, non-Hispanic women, women with an annual household income of <$10,000 or $25,000–$50,000, and insured women), the

FIGURE 4. Percentage* of women with an intact uterine cervix who reported ever having a Papanicolaou (Pap) test and having a Pap test within the past 2 years, 38 states — Behavioral Risk Factor Surveillance System (BRFSS), 1991–1997
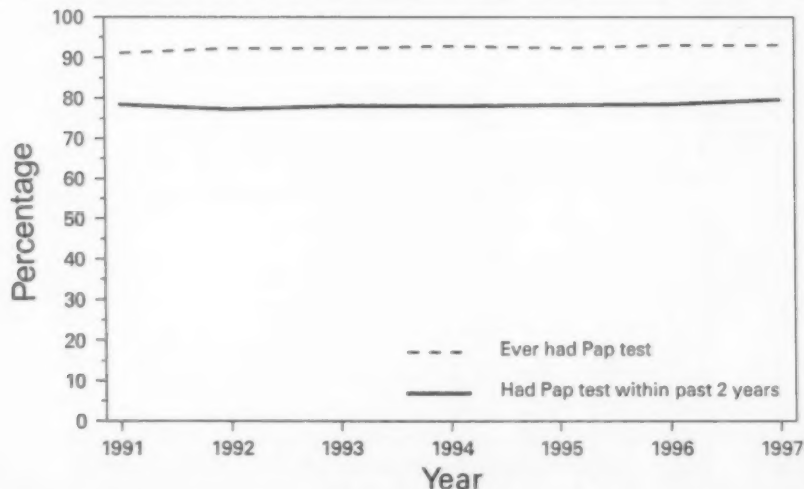
*Adjusted to the 1989 BRFSS age distribution for women.

TABLE 7. Number of women with an intact uterine cervix participating and the percentage who reported ever having a Papanicolaou (Pap) test and having a Pap test within the past 2 years, by state — Behavioral Risk Factor Surveillance System (BRFSS), 1991 and 1997

	No.		Ever had Pap test								Had Pap test within past 2 years							
			1991				1997				1991				1997			
			Unadjusted		Adjusted*		Unadjusted		Adjusted		Unadjusted		Adjusted		Unadjusted		Adjusted	
State	1991	1997	%	(SE†)	%	(SE)	%	(SE)	%	(SE)	%	(SE)	%	(SE)	%	(SE)	%	(SE)
Alabama	839	907	92.5	(1.1)	92.0	(1.1)	96.4	(0.7)	96.8	(0.6)	82.4	(1.5)	80.3	(1.5)	81.5	(1.4)	79.8	(1.4)
Arizona	654	794	91.0	(1.5)	91.9	(1.3)	82.8	(2.0)	81.8	(2.1)	78.9	(1.9)	77.9	(1.9)	77.3	(2.2)	76.0	(2.2)
California	1,279	1,826	90.1	(1.0)	90.5	(1.0)	91.7	(0.9)	91.7	(0.9)	80.4	(1.3)	79.6	(1.3)	79.0	(1.1)	78.3	(1.2)
Connecticut	861	1,101	93.2	(1.1)	92.8	(1.1)	91.9	(0.9)	91.0	(0.9)	81.7	(1.5)	79.9	(1.5)	79.6	(1.5)	78.7	(1.6)
Florida	982	1,525	89.9	(1.3)	89.7	(1.2)	92.4	(0.8)	91.8	(0.8)	76.1	(1.7)	75.6	(1.7)	80.6	(1.1)	80.4	(1.1)
Georgia	767	1,048	94.1	(1.2)	93.8	(1.1)	96.3	(0.7)	95.6	(0.8)	82.7	(1.7)	78.9	(1.7)	88.9	(1.1)	87.2	(1.2)
Hawaii	891	1,000	89.3	(1.4)	88.7	(1.4)	94.9	(0.6)	94.4	(1.0)	79.3	(1.7)	77.0	(1.7)	82.8	(1.4)	82.3	(1.5)
Idaho	735	2,067	93.4	(1.1)	93.9	(0.9)	95.1	(0.6)	95.6	(0.6)	78.0	(1.8)	76.9	(1.8)	76.2	(1.2)	74.4	(1.2)
Illinois	837	1,420	87.1	(1.4)	87.3	(1.3)	93.2	(0.7)	92.6	(0.7)	79.1	(1.5)	78.3	(1.5)	79.1	(1.5)	77.8	(1.5)
Indiana	914	996	93.6	(0.9)	93.5	(0.8)	96.2	(0.7)	96.1	(0.7)	79.4	(1.6)	77.8	(1.5)	77.7	(1.2)	76.8	(1.2)
Iowa	701	1,653	93.2	(1.2)	91.3	(1.1)	94.7	(0.7)	94.8	(0.7)	80.8	(1.6)	80.5	(1.6)	75.2	(1.1)	75.7	(1.2)
Kentucky	863	1,621	91.7	(1.1)	91.5	(1.1)	92.1	(0.8)	91.8	(0.8)	83.3	(1.9)	74.3	(1.6)	75.5	(1.1)	76.5	(1.2)
Maine	570	736	95.1	(1.0)	94.8	(1.0)	95.6	(0.7)	95.2	(1.0)	84.9	(1.4)	83.2	(1.5)	84.5	(1.6)	83.4	(1.6)
Maryland	859	2,083	92.0	(1.2)	91.6	(1.2)	94.2	(0.7)	93.3	(0.7)	79.4	(1.8)	82.1	(1.8)	85.3	(1.0)	83.5	(1.1)
Massachusetts	694	850	92.9	(0.8)	92.1	(1.2)	93.4	(1.1)	93.0	(1.1)	79.7	(1.4)	76.7	(1.8)	86.0	(1.4)	84.6	(1.5)
Michigan	1,113	1,168	92.6	(1.3)	93.5	(0.7)	94.4	(0.7)	94.4	(0.7)	79.8	(1.1)	78.7	(1.1)	82.0	(1.0)	81.9	(1.2)
Minnesota	1,593	2,158	93.1	(1.6)	92.6	(1.2)	94.2	(0.7)	91.9	(0.7)	83.7	(1.7)	79.1	(1.1)	77.4	(1.0)	77.0	(1.0)
Missouri	707	884	93.5	(1.3)	93.3	(1.4)	95.7	(0.9)	95.6	(0.9)	83.7	(1.7)	83.1	(1.6)	79.6	(1.7)	79.5	(1.8)
Montana	526	778	93.7	(1.2)	93.9	(1.1)	94.8	(0.7)	94.9	(0.7)	78.5	(2.0)	76.8	(2.0)	80.1	(1.7)	79.6	(1.8)
Nebraska	614	1,240	88.8	(1.3)	88.5	(1.1)	94.8	(0.7)	94.5	(1.0)	79.4	(1.8)	77.8	(1.8)	80.1	(1.6)	79.8	(1.8)
New Hampshire	717	795	86.6	(1.3)	86.6	(1.5)	92.3	(1.4)	91.7	(1.3)	75.7	(2.4)	74.4	(2.1)	83.8	(1.6)	82.6	(1.8)
New Mexico	501	1,773	92.5	(1.3)	91.5	(1.4)	94.7	(0.7)	92.0	(0.8)	78.3	(1.5)	76.9	(1.7)	75.5	(1.0)	73.4	(1.9)
New York	940	1,596	91.4	(1.4)	91.2	(1.1)	94.7	(0.7)	94.5	(0.7)	83.5	(1.6)	81.7	(1.6)	82.6	(1.0)	81.2	(1.1)
North Carolina	816	777	93.1	(1.3)	92.7	(1.1)	93.8	(1.1)	94.2	(0.8)	76.0	(1.7)	75.4	(1.6)	84.0	(1.6)	82.7	(1.1)
North Dakota	826	1,442	95.2	(0.8)	95.1	(0.7)	95.1	(1.1)	94.7	(0.8)	80.2	(2.0)	77.9	(2.1)	78.1	(1.6)	78.5	(1.2)
Ohio	563	703	92.3	(0.9)	93.4	(1.0)	94.9	(1.1)	94.9	(1.0)	79.3	(1.8)	77.2	(2.0)	83.5	(1.8)	82.3	(1.2)
Oklahoma	602	1,401	94.1	(1.0)	94.3	(0.9)	95.3	(0.7)	92.3	(0.7)	83.4	(1.1)	81.9	(1.4)	80.7	(1.2)	80.3	(1.3)
Oregon	1,402	1,662	93.7	(1.0)	91.8	(1.1)	92.3	(0.7)	94.9	(0.8)	76.5	(1.2)	75.6	(1.4)	78.1	(1.2)	78.3	(1.3)
Pennsylvania	1,109	980	91.5	(0.9)	92.6	(1.1)	92.3	(0.7)	95.8	(0.8)	86.2	(1.2)	84.5	(1.3)	86.1	(1.4)	84.5	(1.3)
South Carolina	855	1,371	91.4	(1.1)	91.2	(1.0)	95.0	(0.7)	95.0	(0.7)	81.0	(1.3)	80.9	(1.4)	83.4	(1.4)	81.1	(1.3)
South Dakota	845	980	93.7	(1.0)	94.3	(0.9)	94.6	(0.6)	94.4	(0.7)	81.4	(1.3)	80.9	(1.4)	80.8	(1.4)	82.7	(1.2)
Tennessee	1,178	1,371	91.5	(0.9)	91.8	(1.1)	92.0	(1.4)	91.9	(1.0)	77.3	(1.8)	74.9	(1.9)	76.9	(1.5)	74.5	(1.6)
Texas	660	1,092	91.4	(1.3)	91.8	(1.0)	90.7	(1.4)	92.6	(0.9)	77.3	(1.8)	77.0	(1.7)	72.4	(1.5)	74.5	(1.6)
Utah	810	1,208	90.9	(1.4)	91.6	(1.0)	94.6	(1.7)	92.6	(1.2)	86.5	(1.8)	85.0	(1.8)	84.4	(1.5)	83.4	(1.5)
Virginia	815	1,625	91.7	(1.3)	91.2	(1.3)	96.2	(0.9)	95.9	(0.9)	85.4	(1.5)	84.5	(1.4)	81.4	(1.3)	79.8	(1.4)
Washington	925	1,594	94.9	(0.9)	95.1	(0.9)	93.2	(0.8)	93.2	(0.9)	73.7	(1.4)	73.2	(1.4)	74.7	(1.5)	74.5	(1.4)
West Virginia	1,112	1,083	91.2	(1.0)	91.8	(0.9)	93.2	(0.8)	93.2	(0.9)	73.7	(1.4)	73.2	(1.4)	74.7	(1.5)	74.5	(1.4)
Wisconsin	570	1,017	91.6	(1.4)	91.2	(1.4)	95.0	(0.8)	94.9	(0.8)	80.6	(1.9)	73.2	(1.4)	78.9	(1.6)	77.9	(1.6)
Total	**32,245**	**47,664**	**91.2**	**(0.3)**	**91.2**	**(0.3)**	**93.3**	**(0.2)**	**93.1**	**(0.2)**	**80.0**	**(0.4)**	**78.4**	**(0.4)**	**80.7**	**(0.3)**	**79.7**	**(0.3)**
Median			**92.5**		**92.2**		**94.7**		**94.5**		**79.6**		**78.1**		**80.2**		**79.7**	
Low			**86.8**	**(1.3)**	**86.6**	**(1.2)**	**82.8**	**(1.4)**	**81.8**	**(1.4)**	**73.7**	**(1.4)**	**73.2**	**(1.4)**	**72.4**	**(1.8)**	**72.4**	**(1.8)**
High			**95.2**	**(0.8)**	**95.1**	**(0.9)**	**96.4**	**(0.8)**	**96.8**	**(0.8)**	**86.3**	**(1.5)**	**85.0**	**(1.6)**	**88.9**	**(1.1)**	**87.2**	**(1.2)**

* Adjusted to the 1989 BRFSS age distribution for women.
† Standard error of the estimate.

TABLE 8. Percentage* of women with an intact uterine cervix who reported ever having a Papanicolaou test, 36 states — Behavioral Risk Factor Surveillance System (BRFSS), 1991–1997

Characteristic	1991 %	(±95% CI†)	1992 %	(±95% CI)	1993 %	(±95% CI)	1994 %	(±95% CI)	1995 %	(±95% CI)	1996 %	(±95% CI)	1997 %	(±95% CI)
Age (yrs)														
<40	90.2	(0.8)	91.2	(0.7)	90.9	(0.7)	91.5	(0.7)	91.1	(0.8)	90.7	(0.7)	91.2	(0.7)
40–49	97.4	(0.8)	97.5	(0.6)	97.4	(0.6)	97.8	(0.5)	96.8	(0.7)	97.9	(0.5)	97.6	(0.5)
50–59	94.1	(1.6)	95.1	(1.2)	96.0	(1.0)	96.2	(1.0)	96.0	(1.3)	96.8	(0.8)	96.8	(0.9)
60–69	91.4	(1.6)	92.5	(1.3)	93.4	(1.2)	94.4	(1.1)	93.8	(1.3)	95.9	(0.9)	95.1	(1.0)
≥70	83.4	(1.7)	85.3	(1.6)	86.0	(1.4)	85.9	(1.5)	86.7	(1.4)	88.2	(1.3)	88.4	(1.3)
Race														
White	92.0	(0.5)	92.7	(0.5)	93.2	(0.5)	93.6	(0.4)	93.0	(0.5)	93.8	(0.4)	93.7	(0.4)
Black	89.6	(1.7)	91.9	(1.4)	91.0	(1.5)	92.0	(1.5)	93.1	(1.3)	93.3	(1.2)	94.3	(1.0)
Asian American or Pacific Islander	74.3	(4.5)	79.8	(3.9)	77.8	(4.4)	80.2	(3.4)	78.6	(3.6)	84.1	(2.9)	81.6	(4.3)
American Indian or Alaska Native	83.2	(5.8)	88.6	(4.9)	94.7	(3.6)	90.5	(4.6)	91.0	(4.7)	94.2	(2.9)	90.9	(4.1)
Other	88.4	(4.1)	84.0	(4.6)	79.5	(4.1)	81.0	(3.6)	85.6	(3.4)	78.5	(5.2)	83.1	(4.2)
Race and age (yrs)														
White														
<40	91.3	(0.8)	91.8	(0.7)	92.0	(0.8)	92.5	(0.7)	91.6	(0.9)	91.8	(0.7)	91.8	(0.7)
40–49	97.6	(0.8)	97.9	(0.6)	98.3	(0.5)	98.3	(0.5)	97.4	(0.7)	98.7	(0.4)	98.4	(0.4)
50–59	95.2	(1.5)	96.1	(1.1)	96.6	(0.9)	97.0	(0.9)	96.5	(1.5)	97.3	(0.8)	97.2	(0.7)
60–69	92.1	(1.6)	92.7	(1.4)	94.2	(1.1)	95.3	(1.1)	94.4	(1.2)	96.0	(0.9)	95.8	(0.9)
≥70	84.0	(1.8)	85.9	(1.6)	86.6	(1.5)	86.5	(1.5)	87.5	(1.4)	88.8	(1.3)	89.2	(1.2)
Black														
<40	90.1	(2.3)	93.9	(1.6)	92.4	(1.8)	91.5	(0.8)	95.0	(1.4)	93.1	(1.4)	95.1	(1.3)
40–49	97.5	(1.9)	97.2	(1.9)	96.7	(1.8)	97.8	(0.6)	95.2	(2.9)	97.6	(1.6)	97.4	(1.5)
50–59	89.6	(6.6)	93.6	(5.1)	93.5	(5.1)	96.2	(1.0)	98.2	(1.3)	95.6	(3.1)	96.9	(1.8)
60–69	88.6	(5.4)	91.0	(4.0)	87.9	(5.4)	94.4	(1.2)	90.3	(5.8)	95.6	(2.7)	93.4	(3.9)
≥70	78.8	(5.7)	77.2	(6.6)	79.4	(5.9)	85.9	(1.6)	81.2	(6.4)	83.7	(5.4)	84.9	(4.6)
Ethnicity														
Hispanic	84.0	(2.7)	84.3	(2.4)	84.0	(2.4)	84.0	(2.5)	86.1	(2.1)	84.4	(2.5)	86.7	(2.2)
Non-Hispanic	91.9	(0.5)	93.0	(0.4)	93.0	(0.4)	93.6	(0.4)	93.3	(0.5)	93.9	(0.4)	93.8	(0.4)
Annual household income														
<$10,000	86.6	(1.7)	87.5	(1.5)	86.7	(1.5)	89.4	(1.2)	85.5	(2.3)	89.5	(1.9)	89.0	(2.0)
$10,000 to <$25,000	91.3	(1.0)	92.5	(0.8)	92.1	(0.8)	94.2	(0.7)	92.2	(1.1)	91.9	(0.9)	92.9	(0.8)
$25,000 to $50,000	94.2	(0.9)	94.2	(0.9)	94.7	(0.9)	94.8	(0.9)	95.2	(0.6)	94.9	(0.7)	95.0	(0.6)
>$50,000	93.4	(1.5)	94.1	(1.3)	95.6	(1.0)	94.2	(1.4)	94.6	(1.4)	94.5	(1.1)	93.8	(1.4)
Education (yrs)														
<12	84.2	(2.0)	86.4	(1.6)	86.3	(1.7)	89.0	(1.4)	86.8	(1.7)	88.2	(1.6)	88.6	(1.5)
12	91.4	(0.9)	92.3	(0.7)	92.6	(0.7)	92.6	(0.7)	92.6	(0.7)	92.9	(0.7)	93.5	(0.6)
>12	93.5	(0.6)	94.0	(0.6)	94.1	(0.5)	94.6	(0.5)	94.4	(0.6)	94.5	(0.5)	94.2	(0.5)
Health-care insurance														
Yes	92.7	(0.5)	93.2	(0.5)	93.2	(0.4)	93.7	(0.4)	93.3	(0.5)	94.0	(0.4)	94.0	(0.4)
No	82.0	(2.4)	85.2	(1.9)	82.0	(2.6)	84.0	(2.5)	84.9	(2.6)	86.6	(2.3)	85.3	(2.5)
Total	91.1	(0.5)	92.2	(0.5)	92.3	(0.4)	92.8	(0.4)	92.4	(0.5)	93.0	(0.4)	93.1	(0.4)

* Adjusted to the 1989 BRFSS age distribution for women.
† Confidence interval.

TABLE 9. Percentage* of women with an intact uterine cervix who reported having a Papanicolaou test within the past 2 years, 38 states — Behavioral Risk Factor Surveillance System (BRFSS), 1991–1997

Characteristic	1991 %	1991 (±95% CI)	1992 %	1992 (±95% CI)	1993 %	1993 (±95% CI)	1994 %	1994 (±95% CI)	1995 %	1995 (±95% CI)	1996† %	1996† (±95% CI)	1997 %	1997 (±95% CI)
Age (yrs)														
<40	84.4	(0.9)	83.9	(0.8)	83.8	(0.8)	84.2	(0.8)	83.5	(0.9)	83.0	(0.8)	84.2	(0.8)
40–49	84.0	(1.6)	81.2	(1.5)	82.4	(1.3)	81.9	(1.3)	82.0	(1.4)	82.6	(1.2)	83.0	(1.1)
50–59	78.5	(2.4)	76.7	(2.2)	78.8	(2.0)	76.2	(2.1)	80.1	(2.1)	80.1	(1.8)	82.8	(1.7)
60–69	68.7	(2.5)	68.2	(2.3)	71.9	(2.2)	72.5	(2.1)	71.3	(2.3)	74.2	(2.1)	76.5	(2.0)
≥70	58.5	(2.4)	56.6	(2.1)	56.9	(2.1)	57.4	(2.1)	59.6	(2.1)	58.9	(2.0)	58.7	(1.9)
Race														
White	78.9	(0.8)	77.4	(0.7)	78.7	(0.7)	78.5	(0.7)	78.4	(0.7)	78.8	(0.6)	80.1	(0.6)
Black	80.4	(2.2)	79.9	(2.1)	79.5	(2.1)	80.6	(2.0)	82.5	(1.9)	81.6	(1.9)	83.9	(1.6)
Asian American or Pacific Islander	59.7	(5.5)	67.2	(4.6)	66.5	(5.1)	67.0	(4.5)	68.9	(4.0)	72.6	(4.5)	72.9	(4.6)
American Indian or Alaska Native	67.6	(8.0)	76.4	(6.0)	77.6	(6.1)	77.8	(6.4)	75.1	(7.0)	74.2	(6.9)	69.2	(6.2)
Other	72.8	(7.1)	71.1	(5.6)	68.2	(4.8)	66.4	(4.7)	73.6	(4.5)	66.2	(5.8)	66.7	(5.6)
Race and age (yrs)														
White														
<40	85.4	(0.9)	84.0	(0.9)	84.6	(0.9)	84.7	(0.9)	83.8	(1.0)	83.6	(0.9)	84.5	(0.8)
40–49	83.7	(1.7)	81.6	(1.6)	82.7	(1.4)	82.4	(1.4)	82.0	(1.5)	82.6	(1.3)	83.1	(1.2)
50–59	78.6	(2.5)	77.3	(2.3)	79.4	(2.1)	76.4	(2.3)	79.2	(2.3)	80.5	(1.9)	83.2	(1.7)
60–69	69.1	(2.6)	68.2	(2.4)	72.6	(2.3)	73.4	(2.2)	70.9	(2.4)	73.5	(2.2)	77.3	(2.0)
≥70	58.7	(2.5)	56.5	(2.2)	56.9	(2.2)	57.4	(2.2)	60.1	(2.2)	59.5	(2.0)	59.2	(1.9)
Black														
<40	85.5	(2.6)	89.8	(1.9)	88.8	(2.0)	89.6	(1.8)	89.3	(2.0)	88.6	(2.1)	91.0	(1.7)
40–49	86.9	(4.3)	83.2	(4.4)	84.4	(4.3)	82.7	(4.5)	84.5	(4.3)	85.9	(3.6)	89.0	(2.7)
50–59	80.5	(8.0)	78.3	(7.7)	73.3	(8.1)	76.7	(7.5)	85.9	(4.7)	78.8	(7.2)	84.6	(4.5)
60–69	71.8	(8.1)	66.4	(9.0)	66.2	(8.1)	70.1	(7.8)	72.2	(8.3)	81.7	(5.7)	75.4	(7.0)
≥70	61.8	(7.8)	54.4	(8.1)	58.0	(7.4)	58.9	(8.1)	60.9	(8.1)	52.5	(8.5)	58.6	(7.1)
Ethnicity														
Hispanic	70.8	(3.5)	70.2	(3.3)	71.7	(3.1)	69.8	(3.2)	74.8	(2.8)	70.6	(3.1)	72.8	(2.8)
Non-Hispanic	79.1	(0.7)	78.0	(0.6)	78.8	(0.6)	78.9	(0.6)	78.9	(0.7)	79.5	(0.6)	80.5	(0.6)
Annual household income														
<$10,000	70.3	(2.2)	68.3	(2.0)	67.9	(1.9)	72.0	(1.7)	66.0	(3.2)	68.1	(2.8)	68.7	(2.7)
$10,000 to <$25,000	75.4	(1.4)	74.4	(1.3)	74.7	(1.3)	75.4	(1.3)	73.9	(1.4)	72.9	(1.3)	75.0	(1.2)
$25,000 to <$50,000	83.6	(1.4)	81.9	(1.4)	82.2	(1.4)	81.7	(1.4)	81.4	(1.2)	81.5	(1.1)	81.7	(1.1)
>$50,000	83.3	(2.5)	85.0	(2.0)	86.3	(2.0)	83.3	(2.2)	86.3	(1.9)	86.1	(1.8)	84.5	(1.8)
Education (yrs)														
<12	68.9	(2.3)	65.7	(2.1)	67.1	(2.1)	69.9	(2.0)	69.3	(2.1)	67.9	(2.2)	70.2	(2.0)
12	77.2	(1.2)	76.0	(1.1)	76.6	(1.1)	76.5	(1.1)	76.3	(1.1)	76.3	(1.1)	78.4	(1.0)
>12	82.5	(1.0)	81.5	(0.9)	82.6	(0.9)	81.8	(0.9)	82.7	(0.9)	82.7	(0.8)	83.1	(0.8)
Health-care insurance														
Yes	80.7	(0.7)	79.4	(0.7)	80.4	(0.6)	80.4	(0.6)	80.5	(0.7)	81.1	(0.6)	82.2	(0.6)
No	63.2	(2.7)	61.7	(2.6)	58.1	(2.9)	60.1	(3.0)	62.0	(3.0)	59.3	(2.7)	64.5	(2.8)
Total	78.4	(0.7)	77.2	(0.6)	78.1	(0.6)	78.1	(0.6)	78.3	(0.7)	78.5	(0.6)	79.7	(0.6)

* Adjusted to the 1989 BRFSS age distribution for women.
† Data are missing for Tennessee.
§ Confidence interval.

differences between the highest and lowest values were less that 5 percentage points
and did not represent substantial change.

DISCUSSION

Screening for and early detection of breast and cervical cancers are most effective
if they are performed for each woman at regular intervals. Yet for both types of screen-
ing, the proportion of women who were ever screened and the proportion who were
screened within the previous 2 years differed substantially. This difference may indi-
cate that some women who participate in initial screening do not continue to be
screened at regular intervals. It may be that the full benefits of breast and cervical
cancer screening have not been achieved in the United States.

Breast Cancer Screening

BRFSS data are consistent with other survey findings that breast cancer screening
has increased over the past decade. For example, the proportion of women aged
≥50 years participating in the National Health Interview Survey who reported ever
having a mammogram increased from 37% in 1987 to 67% in 1992, and the proportion
who reported receiving a mammogram within the previous 3 years increased from
23% in 1987 to 49% in 1992 (14). In a separate report from the same survey, the pro-
portion of women aged ≥50 years who reported having had both a mammogram and
a CBE within the preceding 2 years increased from 25% in 1987 to 51% in 1992 (15).
From 1990 through 1995, the proportion of women aged ≥40 years who reported regu-
lar breast cancer screening as recommended by the American Cancer Society
increased from 31% to 47% (16). Despite these substantial gains in use of breast can-
cer screening, its use continues to be low among several subgroups, including women
with low income, less education, and no health-care insurance (17).

Several professional organizations have endorsed guidelines for breast cancer
screening. All the guidelines recommend periodic mammograms and CBEs but differ
on recommended frequency and age to begin breast cancer screening (6). The U.S.
Preventive Services Task Force recommends a screening mammogram, with or with-
out an annual CBE, every 1–2 years for women aged 50–69 years (5). Other women
(e.g., those aged <50 years who are at high risk for breast cancer) might also be rec-
ommended for screening after consultation with their physicians. The American
Cancer Society recommends an annual screening mammogram with a concurrent
CBE for women aged ≥40 years (18). The American Medical Association recommends
an annual or biennial screening mammogram and an annual CBE for women aged
40–49 years and an annual mammogram with CBE for women aged ≥50 years (19).

Healthy People 2000 objective 16.11 is to "increase to at least 80 percent the pro-
portion of women aged 40 and older who have ever received a clinical breast
examination and a mammogram, and to at least 60 percent those aged 50 and older
who have received them within the preceding 1 to 2 years" (20). The BRFSS data in
this report indicate encouraging increases in the proportions of all women who
reported ever having had a mammogram, having their last mammogram as part of a
routine checkup, and having a mammogram within the previous 2 years.

Cervical Cancer Screening

The BRFSS findings for use of Pap tests are consistent with results from the 1987 and 1990 National Health Interview Surveys. In the latter survey, the proportion of women who reported ever having a Pap test (approximately 90%) and the proportion who reported having it within the previous 3 years (approximately 75%) did not change substantially from 1987 through 1990 (*14,15,21*). In both the BRFSS and the National Health Interview Surveys, Hispanic women, women with less than a high school education, and women with the lowest household income were generally less likely than their counterparts to report having received a Pap test. Women without health-care insurance have also been found to be less likely than women with insurance to receive Pap tests (*17*).

The U.S. Preventive Services Task Force recommends Pap tests for all women beginning when they become sexually active (but no later than age 18 years) and then every 3 years for women at normal risk for cervical cancer; the interval may be shorter for women at high risk for the disease (*5*). Screening for cervical cancer may be discontinued after age 65 years for women who have had consistently normal findings on previous examinations, and screening is not recommended for women who have had their uterine cervix removed unless the hysterectomy was part of treatment for cancer. The National Cancer Institute, the American Cancer Society, the American College of Obstetricians and Gynecologists, and the American Medical Association endorse annual Pap tests for women who are sexually active or have reached age 18 years (*5*).

Healthy People 2000 objective 16.12 is to "increase to at least 95 percent the proportion of women aged 18 and older with uterine cervix who have ever received a Pap test, and to at least 85 percent those who received a Pap test within the preceding 1 to 3 years" (*20*). In the current report, the findings that 93% of women reported having ever received a Pap test and that 80% reported having had a Pap test within the previous 2 years suggest that this objective is achievable.

Some part of the gap between the proportions who have ever had a Pap test and those who have had one within the past 2 years may be attributed to the discontinuation of testing among women aged ≥65 years who had a history of regular screening and whose tests results were consistently normal (*5*). Among women aged <65 years, however, the difference most likely results from failure to have Pap tests at regular intervals.

Federal Service Initiatives

Healthy People 2000: National Health Promotion and Disease Prevention Objectives, which was published in 1990 by the U.S. Public Health Service, includes goals for increasing the use and timeliness of breast and cervical cancer screening procedures among all American women and among specific groups of women (e.g., those aged >70 years, blacks, Hispanics, women with low income, and those with less than a high school education) (*20*). Several Federal service initiatives for breast and cervical cancer screening were developed concurrently. These initiatives underscored the growing national appreciation of the importance of breast and cervical cancer screening.

differences between the highest and lowest values were less that 5 percentage points and did not represent substantial change.

DISCUSSION

Screening for and early detection of breast and cervical cancers are most effective if they are performed for each woman at regular intervals. Yet for both types of screening, the proportion of women who were ever screened and the proportion who were screened within the previous 2 years differed substantially. This difference may indicate that some women who participate in initial screening do not continue to be screened at regular intervals. It may be that the full benefits of breast and cervical cancer screening have not been achieved in the United States.

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The Breast and Cervical Cancer Mortality Prevention Act of 1990 mandated a nationwide program to increase access of medically underserved women to comprehensive breast and cervical cancer screening services (*22*). The National Breast and Cervical Cancer Early Detection Program (NBCCEDP), which was established as a result of the mandate, is administered by CDC. NBCCEDP is a program of cooperative agreements with state health agencies, the District of Columbia, American Indian and Alaska Native (AIAN) programs, and U.S. territories. By 1998, 50 states, the District of Columbia, 13 AIANs, and 4 U.S. territories had implemented NBCCEDP comprehensive screening programs. NBCCEDP gives them resources to provide screening, follow-up, and referral services to medically underserved women; to disseminate information to health-care professionals and the general public about detecting and controlling breast and cervical cancer; and to evaluate program activities and the quality of screening procedures. Among medically underserved persons, NBCCEDP identified several high-priority groups: women aged ≥50 years, women of racial or ethnic minority groups, women with low income, and women without health-care insurance.

Federal medical insurance programs have enabled increased use of breast and cervical cancer screening programs. Since 1991, Medicare has provided insurance coverage for screening mammograms and Pap tests (*23,24*). These were among the first preventive services covered by Medicare (*25*). A requirement for participation in the NBCCEDP is that the Medicaid program serving the state (including the District of Columbia), AIAN program, or territory provide coverage for screening mammograms, CBEs, Pap tests, and pelvic examinations.

Limitations

The BRFSS has several limitations. First, estimates of behavioral risk factors are based on self-reports, which may not agree with reports based on other sources (e.g., medical, laboratory, and imaging center records) (*26,27*). Second, the BRFSS does not include in the sampling frame persons who do not have telephones. Approximately 5% of U.S. households do not have a telephone (*28*). Because the geographic and demographic distributions of households with and without telephones differ (*28*), the trends observed in BRFSS may not reflect trends for households without telephones. Third, approximately 20% of eligible respondents refused to participate, which introduces a potential source of bias. Fourth, because the BRFSS sample reflects the population distribution of participating states, the sample may include only minimal numbers of participants in sociodemographic subgroups of particular interest (e.g., Asian Americans or Pacific Islanders). Estimates for these subgroups are accurate, but they are less precise than estimates for subgroups with larger numbers of respondents.

Not all states have participated in the BRFSS since its inception, and multiyear studies can include data only from states that participated in each year of the study. Twelve states and the District of Columbia did not participate each year from 1989 through 1997 and could not be included in this report. These exclusions may limit the generalizability of these findings to the Nation as a whole.

CONCLUSION

These BRFSS results reflect the progress the United States has made toward increasing the proportion of women who have participated in breast cancer screening and illustrate the success the United States has had in maintaining the consistently high proportion of women who have participated in cervical cancer screening. These results also indicate that older women, women with a low annual household income, those with a low level of education, and those without health-care insurance are less likely to participate in breast and cervical cancer screening. National goals should emphasize maintaining screening levels among subgroups of women most likely to participate in screening as well as increasing screening levels among subgroups of women who are less likely to participate in screening.

Initiatives such as the NBCCEDP, which encourage women to participate in initial screening, should continue. But the full benefits of screening on morbidity and mortality due to breast and cervical cancers can be achieved only if a substantial proportion of U.S. women receive screening examinations at regular intervals (*29,30*). The BRFSS findings suggest that national efforts should now aim to preserve current levels of initial cancer screening while emphasizing repeat screening. Additional initiatives specifically to promote rescreening should be developed. Continued surveillance of trends in screening timeliness will help public health officials target and evaluate breast and cervical cancer prevention programs.

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State and Territorial Epidemiologists and Laboratory Directors

State and Territorial Epidemiologists and Laboratory Directors are acknowledged for their contributions to *CDC Surveillance Summaries*. The epidemiologists and the laboratory directors listed below were in the positions shown as of July 1999.

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POSTAGE & FEES PAID
PHS/CDC
Permit No. G-284